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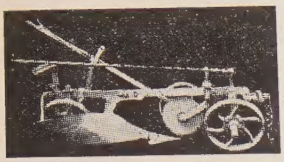

JOURNAL OF AGRICULTURE

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Published by direction of Hon. B. Roberts, Minister of Agriculture.

GREATER FOOD PRODUCTION

MINISTER ANNOUNCES OBJECTIVES FOR 1944-45 SEASON

Primary production objectives for the 1944-45 season as determined by the Government in collaboration with the National Council of Primary Production have been announced by the Minister of Agriculture (the Hon. B. Roberts). The Minister said that the targets set were reasonably within New Zealand's capacity as additional man-power would be released for this purpose.

"THE demand for production to maintain our supplies of butter and cheese is an ever increasing one," Mr. Roberts said, "and I cannot overstress the importance of providing as great a volume of these commodities for Great Britain as possible and at the same time making adequate provision for the requirements of our allies in the Pacific, our own Armed Forces overseas, and our civilian needs. In such commodities as wheat, potatoes, vegetables, and other crops, increases are necessary for the forthcoming season, and though the part played by farmers in the past is worthy of the highest praise, greater efforts will be necessary if we are to reach our farming objective and play our part to the fullest possible extent on the food front.

"At the present time New Zealand is importing large quantities of foodstuffs in which we should be self-supporting. During the current year it will be necessary to import considerable quantities of stock feed, wheat, and other food supplies. The more stock foods which are grown locally the more shipping space will be conserved. New Zealand should grow as much as possible of these products for which the country is suited. In setting out our production objectives for the 1944-45 season I do so in full confidence that to the utmost of his ability the farmer will play his part and give of his best to attain the target figure outlined. In setting targets for the coming season, the objectives are reasonably within New Zealand's capacity, as additional man-power will be released for this purpose. It is naturally impossible to give national priorities, as all the items mentioned are a national necessity, but each district council of primary production will be given its local production targets."

PRODUCTION DETAILS.

Details of production objectives are as follows:—

Dairy Products: Production in the season 1943-44 is estimated at 165,000 tons of butterfat, from a milking herd estimated at 1,680,000 cows. The butterfat objective for the season 1944-45 is for a minimum of 180,000 tons, an increase of 15,000 tons over season 1943-44 estimate. This objective is below the production of the 1940-41 season of 200,000 tons, and the 1941-42 season, when 188,000 tons were produced. To attain this objective it will be necessary to increase the milking herds of the Dominion by 30,000 to 50,000 cows, and the Minister appeals to farmers to utilise all possible heifers and to hold the best in-calf cull cows. Every step should be taken to avoid the slaughter of in-calf cows suitable for milking.

Pig Meats: During season 1943-44 the estimated sow population of the Dominion stands at 75,000 sows, and the total pig meat produced is calculated to be 38,000 tons. Pig meats are a most important commodity in the dietary of the armed forces, and with a view to meeting the requirements of the services and civilians our breeding sow population should be built up to at least 85,000, and our target for pig meats set at 43,000 tons at least. This objective is below the average production of the three pre war seasons. This will mean extensive planning for winter feed on the part of the pig farmer, and the £5 an acre crop subsidy arrangements already announced, adds Mr. Roberts, should give a material incentive to the pig industry to increase production. Details in regard to the operation of the crop subsidy for pigs are at present being worked out in conjunction with the National Pig Industry Council, but at this stage it should be made clear that the subsidy will not apply in cases of grain crops which are grown for general feeding purposes. Attention should in particular be focused by farmers on attaining a greater overall production of weight in pig meat by carrying on porker pigs to baconer weight.

Meat Production: The estimated production of meat for 1943-44 season, including pig meats, is 480,000 tons. The objective for 1944-45 season should be to produce as much as possible of all classes of meats, particular emphasis being placed on pig meats and beef. The need for meat is urgent and all possible supplies should be made available this year.

CROPPING PROGRAMME.

Wheat: The 1943-44 acreage of wheat was approximately 249,000. The objective for 1944-45 should be a minimum of 300,000 acres, which on normal Dominion average (32.1 bushels per acre) should produce 9,630,000 bushels. Farmers in wheat-growing districts are urged to sow as much wheat as possible. This objective was nearly reached in 1942-43, when 287,000 acres were grown.

Barley (Malting): The Dominion requirements of malting barley for brewers and maltsters are approximately 1,200,000 bushels. Allowing for seed requirements, pearling, etc., this requires an increased acreage, based on 35 bushels per acre, to 38,000 acres. The 1941-42 acreage was 36,000 acres.

Feed Barley: With a view to attaining self-sufficiency in feed barley, of which pig-raisers could use up to 30,000 tons per annum, a considerable acreage should be grown in the North Island. To be self-supporting, approximately 40,000 acres would require to be grown, and though it is realised that such an objective may appear to be high, farmers are urged to grow as much feed barley as possible.

Oats (for threshing): The estimated requirement of threshed oats for season 1943-44 is approximately 50,000 acres. To meet full requirements, approximately 60,000 acres of oats for threshing will be required during the season 1944-45. In the years 1940-41 and 1941-42 over 70,000 acres were grown.

Potatoes: For season 1943-44 the potato crop is estimated to be 27,000 acres, with a total production of 108,000 tons of table potatoes. Our requirements for civil and military commitments for season 1944-45 will be approximately 150,000 tons of table potatoes, requiring the growing of 37,500 acres, an increase of 10,500 acres on the past season.

Onions: For season 1943-44 the onion crop from 1000 acres is estimated to be approximately 10,000 tons. This is well below requirements and at least 2000 acres for season 1944-45 should be aimed at if we are to be self-supporting in onions.

Peas: Peas are an important commodity in the food requirements of the United Nations, and the present acreage of 35,000 acres should be maintained during season 1944-45.

Maize: Maize is important for egg and pig production. Our acreage has fallen from 10,700 acres in 1940-41 to 6000 acres in 1943-44. The objective for 1944-45 should be to regain the level of 10,000 acres.

Linen Flax: Production of linen flax has fallen from 20,000 acres in 1941-42 to 10,000 acres in 1943-44. For season 1944-45 the minimum acreage required to maintain factories in production is approximately 21,000 acres, and allocations are now being made to each factory district in order to regain the 1941-42 acreage.

Other Commodities: Maximum production is required in the following commodities: Eggs, certified seeds, tobacco, vegetables. Steps should also be taken by farmers to ensure adequate supplies of summer and winter fodder crops for fattening and winter feed purposes.

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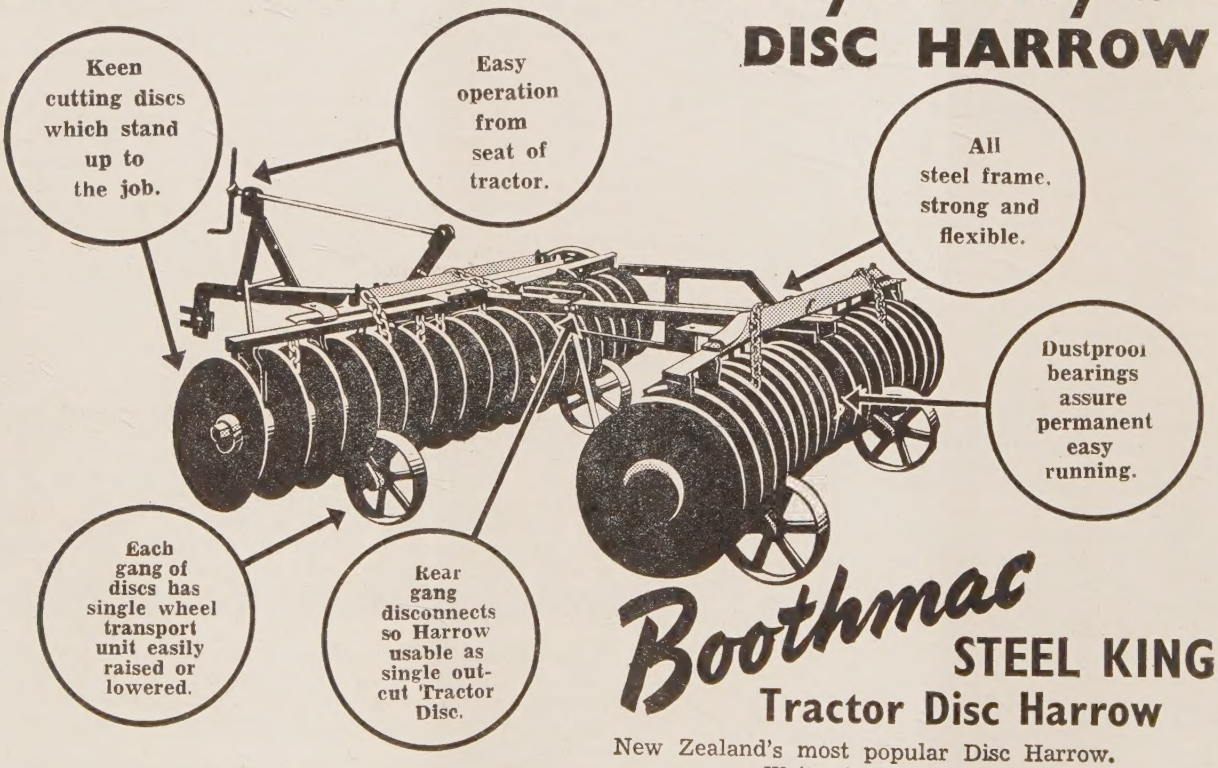
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Quality in the Linen Flax Crop

— By —
A. D. MERCER,
Fields Instructor, Tauranga

The writer of this article, who has had experience in the valuation of standing crops of linen flax, discusses those factors which, from a processing aspect, make or mar the linen flax crop.

LINEN FLAX as a cultivated crop has a very long history. The accumulated knowledge of generations concerning the growing, processing and manufacture is woven into the finished article. In New Zealand it is the latest of the crops in the farmer's rotation and the extraction of fibre one of the youngest of our industries, but every endeavour should be made to ensure that the article exported from this country measures up to the exacting standards of an old-established trade.

Since quality in their raw material is the first demand of the overseas manufacturers this must be the constant aim of the linen flax factories in New Zealand, and to assist in achieving this aim the farmer growing the flax must have some idea of the various factors which in any crop of flax influence the quality of the fibre produced from it.

In the first year or two of the establishment of the industry in this country an incomplete understanding of the factory requirements by the growers led many of them to place undue emphasis upon length of straw, with an almost total disregard of the other factors influencing fibre quality. As a consequence they were somewhat disappointed when their crop was not as highly esteemed by the factory as the foot rule had led them to expect and some appreciation by growers of the various points by which the quality of the fibre may be judged from the standing crop would be to their advantage.

The value of the ripening crop may be judged to some extent almost at the first glance. A promising crop is of good height, golden in colour and level as a table. Further detailed examination of all parts of the area and consideration of the factors enumerated in this article provide a basis upon which some judgment may be made of the quality of the fibre to be produced from the straw. Excellence in some respects only is not sufficient; first-class fibre can be extracted only from the crop possessing **all** the desirable characteristics.

Length of Straw

Since length of fibre is one of the most important factors in determining the grade, the straw must be of good length, and a minimum of 18 ins. of fibre is essential. That portion of the stem between ground level and where branching starts is the only part containing fibre, so that straw of 20 ins. in length to the seed boll may fail to produce the requisite minimum of 18 ins. of fibre. Below this length the product is classed as reiss or tow, the value of both these being only a fraction of that of linen fibre. General experience over the past few seasons indicates that crops from 25 ins. to 30 ins. fibre length produce the best quality, those over 30 ins. being as a rule inclined to coarseness of straw.

Appearance of the root ends has some bearing on quality and length of fibre. in that fine, long and straight roots usually indicate extension of the fibre well down the stem below ground level, while short, thick, twisted roots usually indicate a shortening and coarsening in the fibre.

An absence of branching until the upper extremity of the stem is a necessary feature, as low branching reduces the length of processable straw.

Evenness in length over the whole crop is essential, any great variation involving difficulty in the scutching process and an increase in the proportion of tow. Variation in length between individual straws over the whole crop is a more serious matter

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than a difference in length between two portions of the same area since the differing portions might in some circumstances be processed separately.

Colour

One of the best indications of fibre quality is to be obtained from the colour of the mature straw. This should be of a lemon to creamy colour. Straw which has shed its leaves and remains green is definitely inferior, while straw with a reddish or purple tinge is likely to be regarded with suspicion.

Thickness

The most desirable thickness of straw is about that of a wax match, though there is room for a slight divergence of opinion on this point between different districts. Short crops of 18 ins. to 20 ins. are inclined to be too fine in the straw, while those over 30 ins. are as a general rule too coarse. Most important, however, is uniformity of stem diameter throughout the crop, since varying thicknesses mean uneven retting at the factory, a portion of the tank being neither over nor under-retted.

A small bundle of good straw in the process of ripening has a most decided feeling of quality about it, hard to define but perhaps best expressed as glossiness, sleekness, pliancy, certainly in marked contrast to the harshness and brittleness of a coarse, green crop. This feeling of quality may be associated with straw somewhat finer than the optimum diameter but is entirely lacking in one greater than the required thickness.

Extraneous Factors

Apart from qualities inherent in the straw itself certain other considerations influence the value of a crop. Depreciation may result from several diseases to which flax is subject, one of these being rust. Provided the leaves only are affected no serious damage will result, but dark-brown or black lesions on the stem leave their mark on the fibre with a consequent reduction in grade, while browning or wilt results in weakening of the fibre.

At times, owing to weather conditions, the dead leaves instead of falling remain adhering by the whole surface to the stem, involving a lowering of the straw quality, since the adhering leaf protects the underlying straw to some extent from the retting process, which is consequently uneven.

Hail damage may have serious consequences. In bad cases the straw is cut off at varying heights from the ground and branching takes place below the break, all such straw being worthless for fibre production. Bruising of the stem by hail results in the formation of nodules, each representing a break in the fibre, so that a large percentage of straw affected in this way may render a crop worthless except for the production of tow.

A crop of otherwise good quality may be greatly reduced in its value to the factory by the presence of weeds, some of which, such as thistles, yarrow and fat hen, remain through all the factory processing and reduce fibre grade. A quality crop must be a clean crop, otherwise excellence in all the points dealt with as making up quality is of little avail.

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Dairy Farming In India

In the course of his duties with the Indian army during the present war the writer of this article, Mr. A. D. G. M. Laing, M.R.C.V.S., veterinarian, Hastings, had veterinary charge of a large military dairy farm in the north of India, and he deals interestingly with conditions in the Indian dairying industry.

IN SPITE of the fact that milk is considered a valuable article of diet by all Indians, dairy farming in the New Zealand sense does not exist in India. The nearest approach to it consists of a very few large dairy farms supplying the big towns and a number of Government farms established by the Army authorities for the supply of milk to British and Indian troops. Apart from these, the milk requirements are supplied by cows in very small herds in the villages and towns. In many cases where wealthier people are being supplied it is customary for the particular cows selected by them to be taken round to the house each morning so that the buyer or his representative can observe the milking.

The stock on the farm the writer describes numbered approximately 2000, of which about 100 were Friesians, half three-quarters or seven-eighths bred, from pedigree bulls, on Indian dairy cows; 1900 buffalo cows were also run. The buffalo is, of course, a different species from the ordinary cattle to which we are accustomed. The milk, for instance, consists of 8 to 9 per cent. butter-fat and it has a characteristic taste which many Europeans do not care for, though Indians themselves prefer it.

Good Friesian Stock

The Friesian cows were bred from stock imported from England and were good animals of their type, yielding when fresh five to six gallons of milk, testing about 3 per cent. butter-fat. Milking was carried out three times daily. All heifer calves were hand reared. The buffalo cows were milked twice daily and yielded, when first coming in, about 1½ gallons of milk, testing 8 or 9 per cent. butter-fat. They are big animals and weigh approximately 2000 lbs. live weight. The cows are easy to handle and very phlegmatic in temperament, but the bulls are inclined to be vicious.

All milking was done by hand into pails with special metal covers, over which a straining cloth was tied. The milk was then strained into eight-gallon cans and taken to the pasteurising plant. No cooling was carried out until the milk had been through the pasteurising plant, which was of the holder type with a pen and card indicator, giving a complete and permanent temperature check. Milkers were issued with white caps, shorts and coats.

Cattle Hand Fed

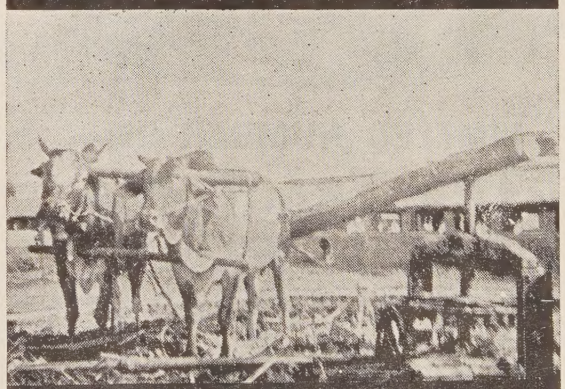
Except during the short rainy season grazing was non-existent. The rainfall where this farm was situated was 10 to 12 ins. yearly, from July till September. The summer temperatures run up to 125 degrees in the shade and winter conditions can be quite cold. The system followed was to feed the cattle by hand in the sheds, where the milking was carried out, and where they spent the night. During the day they were turned out into dry paddocks where a certain amount of shade was available. All manure was conserved and used on the arable land.

Ample supplies of green fodder were grown on irrigated plots, mainly maize, lucerne, and millet. The water for irrigation was obtained from artesian wells mainly by pumps worked by oil engines. The water table was at about 60 ft. deep. Some water was also raised by very primitive methods with bullocks.

A typical scene.

A Sahiwal bull.

Irrigation by waterwheel.



Bullocks at work.

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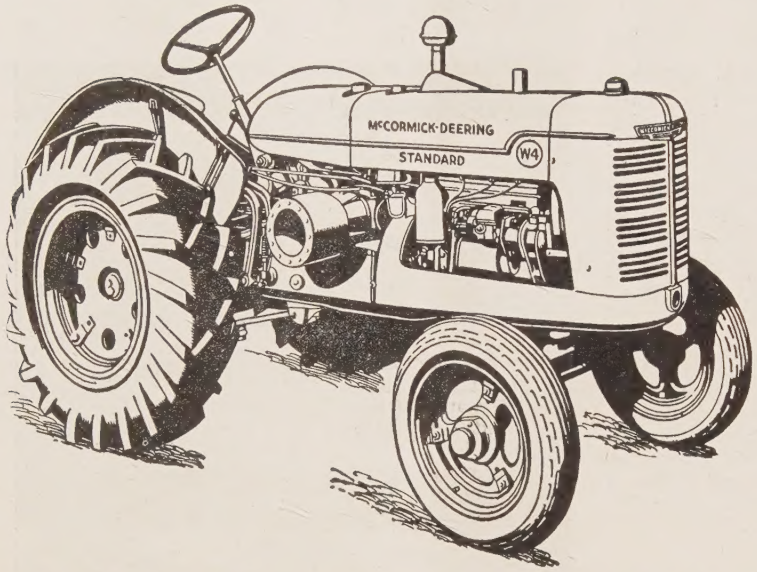

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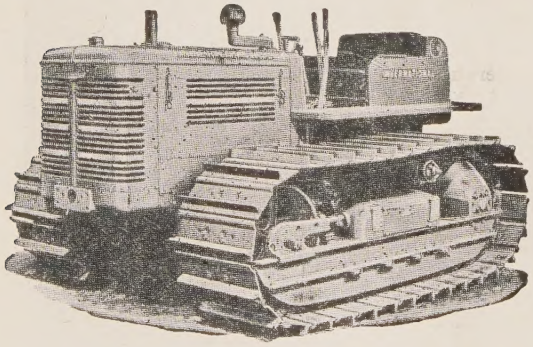

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ALL MODELS ARRIVING SHORTLY ON PNEUMATIC TYRES

Milk was weighed at each milking and the ration for the cows was adjusted on that basis, approximately 3 lb. of grain being given per gallon of milk produced, plus a maintenance ration. A commonly-used concentrate mixture was maize, ground nutcake, bajri (an Indian grain) and cotton-seed cake. Linseed cake was also fed.

The feeding manger was of a similar pattern to that used in Great Britain and the colder European countries, i.e., cement, but watering was carried out at troughs as in the photograph shown. A narrow corridor was left outside the feeding mangers, so as to enable easy filling of the mangers.

Practically No Mammitis

From the veterinary angle the disease position was interesting as compared with what occurs in New Zealand. Mammitis, possibly the worst scourge that we have to face here, was practically non-existent. One wonders whether the three times a day milking by hand and the absence of "forcing" may not have had something to do with the absence of mammitis. The writer's experience over six years on a dairy and mixed farm in South Africa was confirmatory of this. This must not be taken as suggesting that for a farmer in New Zealand to take every possible measure to ensure his cows giving maximum possible milk is unsound practice; it is his job to do so both in his own interests, and, in wartime, in those of the country. It is, however, an illustration of the fact that where cows are pushed to the maximum they are naturally very much more sensitive to the evils to which cow flesh is heir, and precautions must therefore be taken accordingly.

These in the Dominion must comprise mainly:

1. A reasonable rest period between lactations.
2. That the cow should be in good condition when she calves.
3. Avoidance of **sudden** changes in feed, which may result in **sudden** rises in milk production.
4. Refraining from forcing the cow into full production too quickly after calving.
5. Avoidance of chills and overheating.
6. Low vacuum pressures on milking machines.
7. Very careful attention to cleanliness of the teats, teat-cups, milkers' hands, etc.

The incidence of calving troubles was also extremely low, possibly for the same reason as outlined above. Milk fever hardly occurred at all, nor were there instances, during the nine months that the writer had to do with the herd, of the paralysis-staggers symptoms, associated with calving time, which can give so much trouble in New Zealand.

Heavy Debit Side

The good points from the disease angle have been outlined above, but it will be readily realised that in a tropical country such as India the debit side is a very heavy one. Every year all cattle on the farm had to be inoculated against rinderpest, a highly infectious and rapidly fatal disease. This was a complicated business which involved infecting goats with rinderpest virus, obtained from a research station, carefully isolating them, drawing their blood, and injecting a small quantity into each animal. By passing the rinderpest infection through goats it becomes greatly weakened as regards cattle and is sufficient to give rise to a resistance which will prevent an outbreak of the disease for a year. None the less a heavy drop in milk yield, approximately 10 per cent. over a period of three weeks, results after the inoculation, and this was apart from the very considerable disorganisation of the farming operations.

Two outbreaks of foot-and-mouth disease occurred during the period under consideration. Indian cattle have developed during the course of many centuries a strong partial immunity to this scourge, and once it has got into a herd thoroughly it is customary deliberately to infect the whole herd, so as to shorten the total quarantine period. This is done by rubbing saliva by hand from infected cows on the mouths of all cattle in the herd. Apart from a certain amount of lameness due to blisters on the coronets of the hoofs and some blistering in the mouths, no great inconvenience resulted.

Imported Pedigree Stock

In regard to imported pedigree stock, however, the picture is very different. In each outbreak, the moment it was diagnosed, all imported stock had to be placed in isolation in the veterinary hospital, which isolation was maintained with great care until the farm was pronounced free of disease. The only instance which came under notice of an imported animal becoming infected with foot-and-mouth disease illustrated what a very grave matter an outbreak is in stock which have no natural immunity. The animal in question, a Friesian bull, was sick for six months, he lost the hoofs off two feet, and in spite of every precaution developed pneumonia. It was indeed fortunate that he should have recovered at all. The cost in drugs alone amounted to approximately £70, and that is apart from the cost of the attention and nursing over a period of six months which he had to have. In other words, though foot-and-mouth disease may not be fatal in a medical sense, in an economic sense it is completely fatal as it costs far more than the animal's economic value to nurse it back to health. The policy followed in Great Britain and other countries, of slaughter where an outbreak occurs, appeared amply justified.

Other tropical diseases of cattle were observed, but the total wastage from disease did not amount to more than 4 per cent. per annum, i.e., apart from culling.

Only one case of tuberculosis was observed, and abortion did not occur to any extent; where it did occur during the period under review it was traced to feeding causes. One mortality which occurred which may be of interest was amongst the buffalo cows when 4 or 5 died as a result of being unable to digest cotton-seed cake. This cotton-seed cake had given no trouble amongst the Friesian cows, but was of poor quality and badly decorticated, that is to say, the hard covering of the seeds had not been properly removed during the milling process. The buffalo was apparently more sensitive to this than the Friesian cow.

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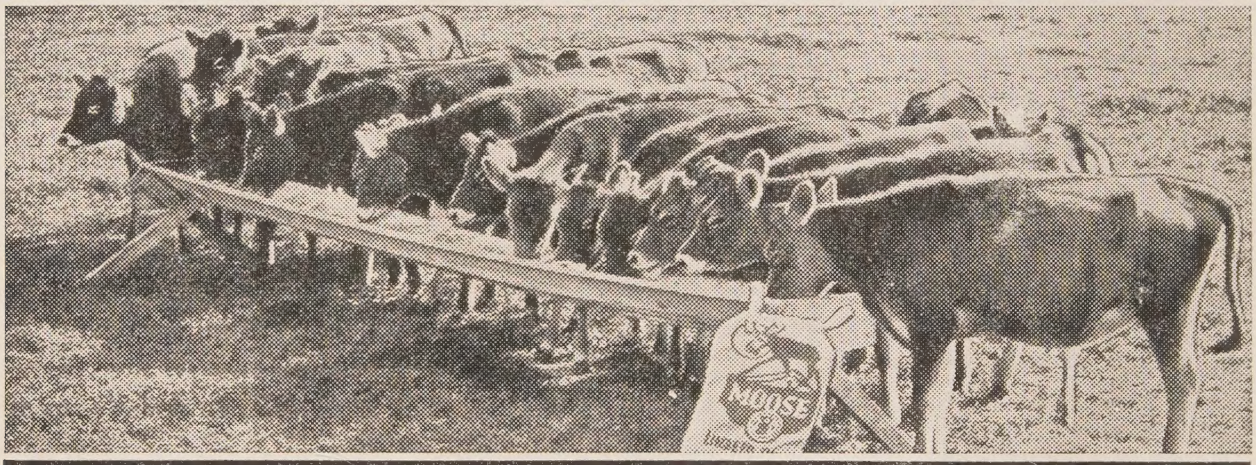

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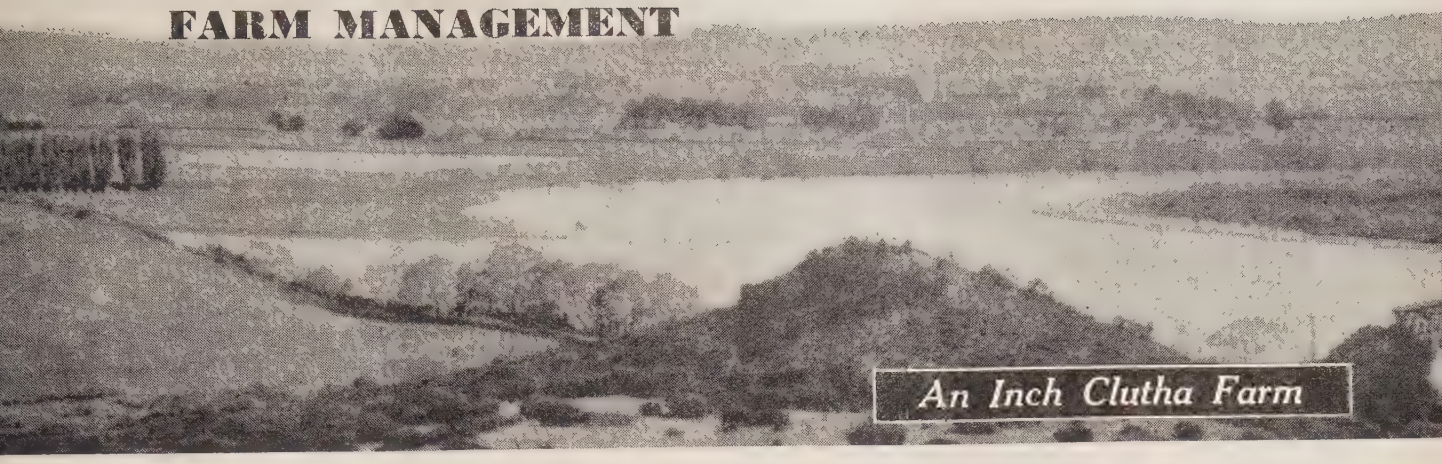


An Inch Clutha Farm

AT THE mouth of the Clutha River lies the island of Inch Clutha, one of the most fertile regions in the Dominion. This high natural fertility, combined with a well-distributed rainfall and methods of good husbandry, produces crops which are often amazingly high in yield. The following article describes how crop production and grassland farming are combined on this area.

— By —

J. G. RICHARDS,
Instructor in Agriculture,
Dunedin.

THE Bruce County, which has as its centre the township of Milton, is some 320,000 acres in area and on this acreage there is a wide diversity of farm types ranging from dairy farms to small grazing areas. The boundaries of the county are the Clutha River in the south, Lake Waihola in the north, and the sea coast in the east. The county extends some 16 miles inland from the sea, being roughly rectangular in shape. Foremost among the natural farming regions of the Bruce County is the island of Inch Clutha, and its environs, which is situated at the southern end of the county in the lower reaches of the Clutha River. It is at the township of Balclutha that the Clutha River divides to form the Inch Clutha Island, the two branches of the river being the Matau, which moves to the left, and the Koau, which moves to the right. The island area confined between these two brances of the Clutha River is some 7,000 acres in area, and on the mainland bordering these streams is another 5,000 odd acres of essentially the same soil type. (See map).

The soil of the island and of those areas on the mainland immediately bordering the edges of the two streams is for the greater part rich alluvial silt, giving the Clutha series of soils which vary from fine sands to coarse sands and gravel. These soils have been formed from the debris of mica-schist rocks carried down and deposited by the Clutha River. Towards the seaward end of the region areas of peaty loam and peat are to be found, and the drainage of the island, a not inconsiderable problem, is carried out by the Lower Clutha River Trust.

The island is flat, though irregular in shape, due to the sinuous course of the Matau branch, and access to the island from the mainland is afforded by two bridges and a river punt. The bridges are situated at Stirling and Kaitangata and the punt at Paretai.

Land as fertile as the Inch Clutha area naturally lends itself to the intense type of farming and thus it is found that the system of farming carried out hinges around the dairy cow.

Climate

The rainfall of the Inch Clutha area is not excessive, the inland portion receiving an annual rainfall of approximately 30 inches, whereas rainfall on the coastal region is above this, being in the vicinity of 35-38 inches per annum. The distribution of rain throughout the year is fairly even, but from rainfall records covering the period 1930-43 it is apparent that the rainfall during September and October is below that of other months. This is of interest from the point of view of spring cultivation and spring sowings. During May to August hard frosts are likely to be experienced and there is generally one light fall of snow each year, but this at the most does not lie for more than a couple of days.

Types of Farming

Essentially dairying country the farms in the area, whilst having dairy-

The Inch Clutha Island has been formed from the debris of mica-schist rocks carried down and deposited by the Clutha River. The Clutha soils vary from fine sands to coarse sands and gravel.

ing as their basis, are more diversified than in the usual dairying districts of New Zealand. Besides butterfat production a variety of produce can be and is grown in the Inch Clutha district, affording much evidence as to the productivity of the soil and to the versatility and skill of the farmers in occupation. It is considered that the soil in this district is one of the more fertile areas, if not the most fertile area of New Zealand. Bordering the land now in production there are many acres of swamp land which if efficiently drained would increase the productive capacity of this region. Dairy farms, mixed farms, fat lamb farms and cattle fattening farms are to be found in the area.

Sources of Income

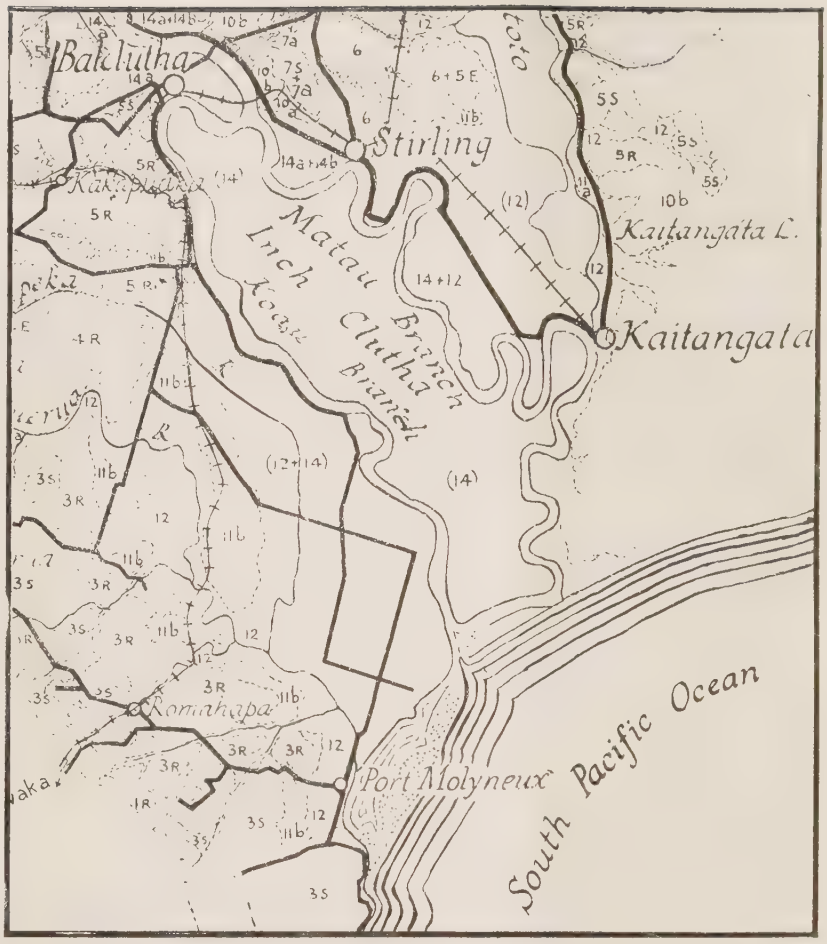
The chief marketable products derived are:—

1. Butterfat for cheese manufacture, there being three strategically situated cheese factories.
2. Whole milk for town supply.
3. Potatoes.
4. Fat cattle.
5. Fat lambs.
6. Wheat.

Other sources of farm income may be the sale of swede turnips for cattle fattening and domestic purposes, the growing of annual crops on contract, such as chicory or mustard, and the sale of hay or grazing. It is rarely that grass and clover seeds are harvested. Oats when grown are almost invariably for chaff. It will be seen from the foregoing that farming in this area is somewhat elastic, the farmer having a wide choice of products with which to supplement his butterfat production. In fact, over the past two or three seasons the output of cheese from the area has fallen, the tendency being for some farmers to reduce their herds and in odd cases to dispose of them altogether and to receive their farm incomes from fat lambs, fat cattle or annual crops.

Wheat Growing

Wheat growing on Inch Clutha is one of the major sidelines and exceptionally good yields between 60-70 bushels are being obtained annually. The acreage of wheat grown each year is in the vicinity of 250 acres, all of which is the Cross 7 variety. One of the major problems confronting farmers on this highly fertile land is the control of annual weeds, and where wheat is grown annual weeds are likely to increase. The position of wheat in the rotation is such that annual weeds are given the least chance to develop. Wheat usually follows on land which has had one or two swede or potato crops, because with these crops the intercultivation given does much to reduce the weed population and the number of weeds likely to occur in the following wheat crop. When following potatoes the cultivator



Soil map of district: 14, Clutha soils; 14a, fine sand; 14b, complex fine sand and peaty loam; 14c, sand and gravelly sand; 14d, coarse sand and gravel.

is run through the potato ground, bringing to the surface many small tubers which lie there exposed to the frost and subsequently decay. A crop of self-sown potatoes in a wheat crop would seriously affect the yield of that crop, but by using the forces of nature the farmer is able to reduce the liability of self-sown potatoes to a minimum.

Wheat is generally sown in September, the seeding being from 2½-3 bushels per acre, and harvesting usually commences in February.

When following swedes the land is ploughed as soon as is convenient after the removal of the swedes. It is a common practice to sow out in grass after wheat. A field of wheat in stook recently seen had been since 1937 under crops which up till 1941 were swedes or potatoes. For 1942 and 1943 seasons the area was in wheat and the yields were over 60 bushels. This example further illustrates the high fertility of the greater part of the soil in the Inch Clutha area.

Fat Lambs

It is estimated that approximately 5,000 fat lambs find their way to the freezing works from this area each year. Those farmers who derive a source of income from fat lambs find it profitable to buy in each March sound full-mouth ewes from which they take a lamb, fattening this and disposing also of the ewes as fats.

The ewes purchased are generally good-framed Romney Cross sheep. Footrot is one of the major reasons for disposal of the ewes annually, but in some cases ewes may be kept a couple of years.

Where sheep are run on dairy farms in this district areas in other sidelines such as wheat and potatoes have to be correspondingly decreased to make way for further pasturage.

Fat Cattle

It is generally recognised that of the stock sold at the Burnside market the fat cattle from the Inch Clutha area are some of the finest offered for sale. In recent years the number of fat cattle coming from the Inch Clutha has been increased, this increase being due chiefly to the fact that one or two farmers have changed completely over

from butterfat production to the raising of fat cattle. Where returns from fat cattle are to provide the major source of farm income cattle of from 2½-3 years old are purchased in September just as grass growth is becoming apparent. These cattle are in the main Hereford, Shorthorn, and Aberdeen Angus Cross, the two first-named breeds being the most favoured.

It is no doubt largely due to the excellence of the swede crops grown that the production of fat cattle is of such high order.

From September to October, when the cattle are purchased, until April the major source of fodder is grass. As hay is usually saved for the provision of a supplement, excellent grazing on hay aftermath in March and April is obtained. The feeding of swedes to stock commences in May and along with these swedes adequate hay is fed. It is in the month of July that the stock begins to go forward to the market.

Prices realised in July-August, 1943, ranged to as high as £35 per head. One field of swedes which carried five bullocks to the acre realised £25 per acre as a grazing proposition, and the stock when sold realised from £30 to £33 per head at Burnside.

TYPICAL FARM ON INCH CLUTHA.

The farm described is one which may be regarded as above the average, but nevertheless is typical of the area and provides an insight into the farm practices and farm management of the district. This farm, which is situated at the western end of the island, is of 146 acres, being divided into 10 main fields, the areas of which range from 7 to 18 acres. Centrally situated is an area of 20 acres which is subdivided into small paddocks and contains the farmer's house and farm buildings. The small fields are utilised for the holding of calves, bulls and horses. At the southern end of the farm there is an area of 11 acres of sandhills carrying a plantation of pines, these affording some shelter from the southerly winds. All fields, except two, are provided with water troughs, the water being pumped from the river. (See farm plan for position of troughs and pipelines). The fields 9 and 10 on the farm plan are those not supplied with troughs, but here provision is made for the stock to have access to the river for water. All fences and gates are in first-class order, the fences being either wire or live hedges of gorse or hawthorn.

Farm Buildings

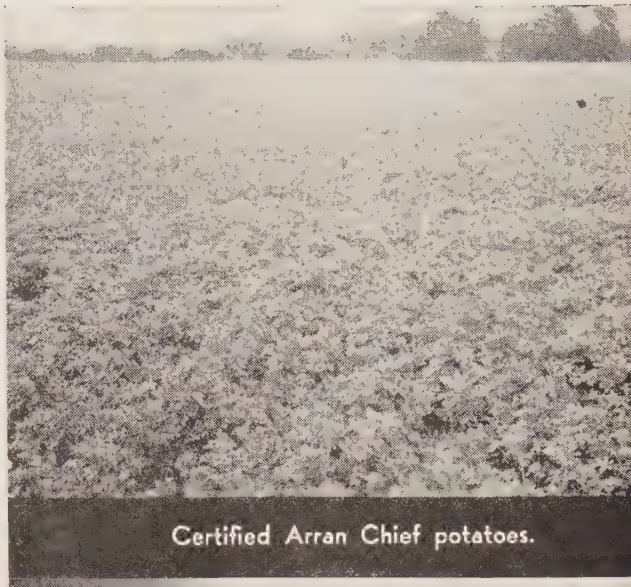
The farm buildings are conveniently situated, consisting of the farmer's house (A), a cowshed (B) of solid construction and containing a four-cow, double-unit, low-line machine, a stable and barn combined (C) and an implement shed (D). This implement shed is a feature of the farm buildings, being 108 ft. long by 26 ft. in depth and constructed of timber with an iron roof. At one end of the shed is a loose box. Besides housing implements the shed is of such size that manures and seeds can be stored with convenience. Full use of this shed is made for the storing and grading of potatoes.

Labour Requirements

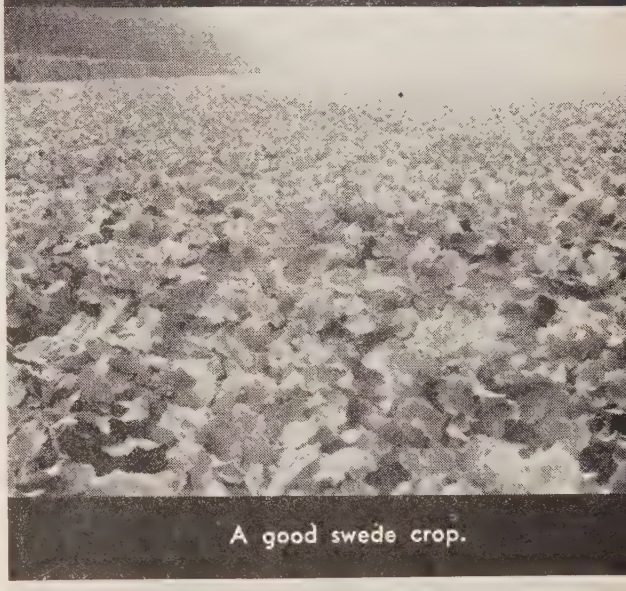
The labour permanently employed on the farm is the farmer himself and a hired boy, assistance in the cowshed and at certain other classes of work being given by the farmer's daughter. Seasonal labour is required for potato picking, turnip thinning and hay-making, and in pre-war times such labour was readily available in the district. Under present-day conditions this source of labour is no longer available, the farmer now having to make full use of schoolboy and army camp labour. Ploughing and heavy cultivation are done by tractor, the farmer's son, who is in occupation of an area of similar size and undertaking a similar programme of work some three miles away, working the tractor on both areas. Not all farmers in the district do their heavy work with tractors; there still is a fair amount of heavy work done by horse teams. The part played by horses on the farm in question is not unimportant, for naturally there is a good deal of single and double horse work required and such work as scuffling is more conveniently done by horses than by the tractor.

Implements

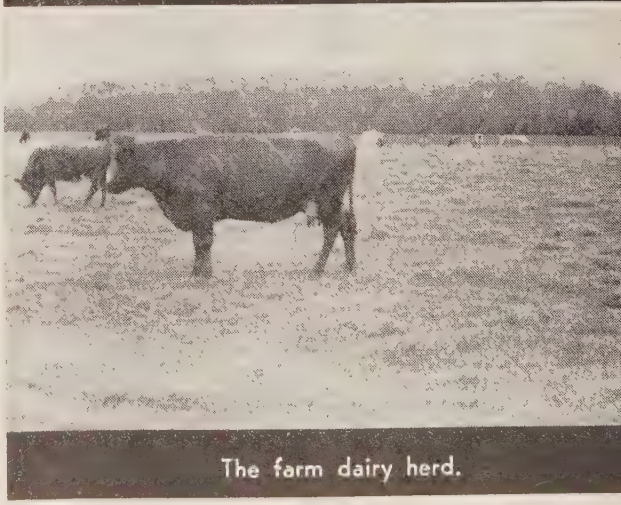
The implements of the farm are as follows: Potato digger, potato planter, discs, harrows, ridger (2 row), two double-furrow



Certified Arran Chief potatoes.



A good swede crop.



The farm dairy herd.

ploughs, single digger, power mower, hay sweep and the necessary sundries, implements such as scufflers.

Livestock

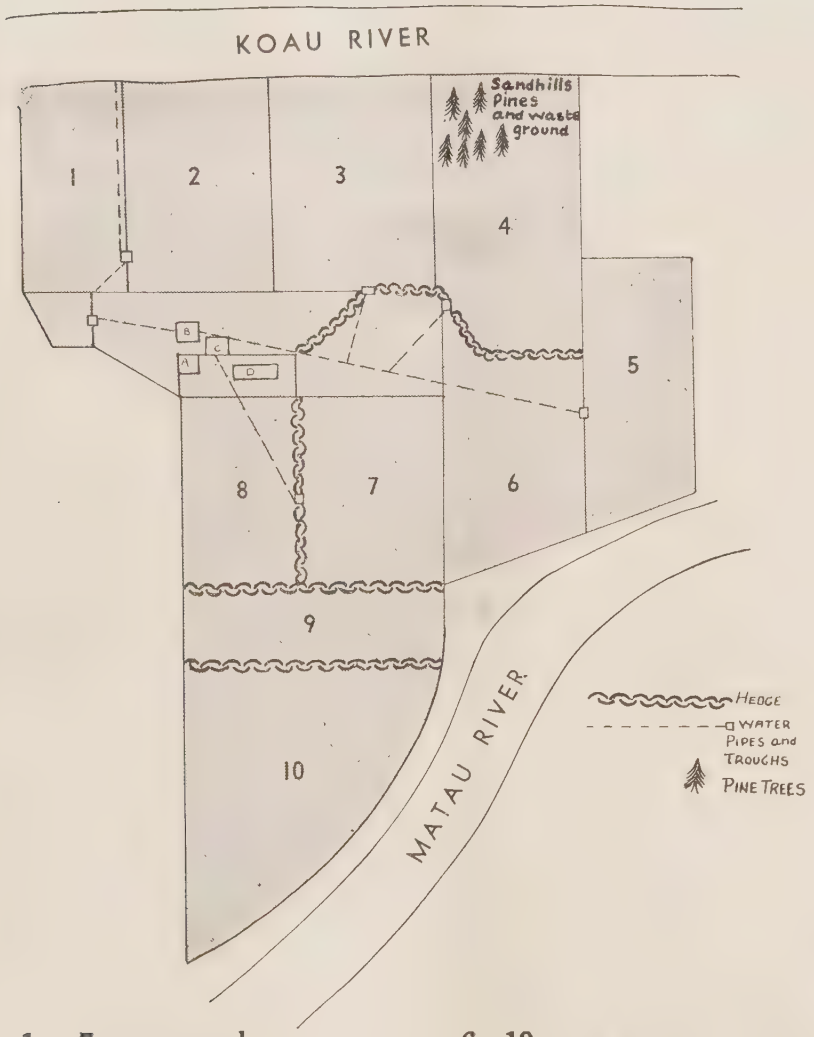
The farm carries 60 dairy cows, 2 bulls, 16 heifers, 19 calves and 8 horses. The dairy cows are Friesians, Shorthorns and crosses of these breeds; Shorthorn bulls are used. Two of the horses are aged and are due for disposal; for normal working 5 horses are sufficient.

Dairy Herd Management

Whole milk is supplied to a cheese factory and the annual butterfat production is 15,000 lb. or 250 lb. per cow. The herd is timed to calve in August and dry off in May; late calvers are milked through the winter. The herd is tested under the supervision of the South Island Herd Testing Association. Dairy calves are fed on whole milk for the first three weeks, then until four months old they receive watered whole milk and meat meal.

Autumn supplementary feeding of the dairy herd commences in April when chou moellier is fed out. Hay and swedes form the main winter feed and swedes are replaced by mangolds in the spring after the cows calve and until grass growth is adequate for full milk production.

Plan of Farm



1. 7 acres swedes.
2. 11 acres grass.
3. 15 acres grass.
4. 13 acres (swedes 9 acres, potatoes 3 acres, chou moellier 1 acre).
5. 8 acres grass.
6. 10 acres grass.
7. 9 acres potatoes (Arran Chief).
8. 8 acres grass.
9. 8 acres (swedes 5 acres, mangolds 3 acres).
10. 18 acres young grass.

A, house; B, cowshed; C, stable and barn; D, implement shed.

Utilisation of Fields

As at April 1, 1944, the following is the cover of individual fields:—

Field 1, 7 acres: Superlative swedes. Previous crop 6-year-old lea.

Field 2. 11 acres: 6-year-old lea. A pasture with perennial ryegrass—white clover dominant and timothy and Montgomery red clover in fair proportions. Weeds mainly docks and minor quantity of broad leaf plantain and chickweed. Will probably be ploughed in July for swedes. Hay was taken from this area in January, 1944. This pasture displayed excellent vigour at April 1, 1944.

Field 3. 15 acres: Part 2-year-old lea and part 3-year-old lea. Dominantly perennial ryegrass with some cocksfoot, timothy, Montgomery red clover and white clover in fair proportions. Some docks and chickweed present.

Field 4. 13 acres: 9 acres Superlative swedes, 3 acres King Edward potatoes, 1 acre chou moellier and soft turnips. This field has now been under cultivation for five seasons and will be sown down this coming spring.

Field 5. 8 acres: 4-year-old lea. Will remain down in grass for at least another 2 years before being ploughed up.

Field 6. 10 acres: 6-year-old lea. Will probably be ploughed up this year.

Field 7. 9 acres: Potatoes. Previous crop was swedes out of lea.

Field 8. 8 acres: 6-year-old lea.

Field 9. 8 acres: 5 acres swedes; 3 acres mangolds. Previous crop potatoes out of lea.

Field 10. 18 acres: Young grass sown in spring of 1943. During the past five seasons this area has been alternately cropped with swedes and potatoes.

Crop Management

Swedes: From the farm plan and the detailed statement of the present field utilisation it will be observed that the fields 1, 4 (part) and 9 are in swedes, these being sown after lea, potatoes and potatoes respectively. The growing of swedes after such previous crops is almost universal in this district and where lea is the previous crop the field is generally ploughed in July, and subsequently worked down into the desirable seed-bed. The crops are sown on 26 in. ridges from mid-October onwards. Varieties commonly used are Superlative and Masterpiece and seed is sown at the rate of from 14 to 18 oz. per acre and manured with up to 3 cwt. of turnip manure. When following potatoes ploughing is generally a month or so later.

On this very fertile land annual weeds are a problem and no little attention must be given to their control. The growing of cereal crops in the district, although high yields are obtained (95 bushels of wheat and 110-115 bushels of oats are known to have been obtained), is not looked upon with any great favour because of the weed growth such crops encourage. The chief weeds are fathen. docks and more recently redshank. By the efficient use of the double and single scufflers, hand thinning and hand weeding these weeds are kept fairly well in check in swede crops.

Yields of swedes have been known to be as high as 90 tons of roots per acre and good crops usually average between 70-80 tons. The swedes are grown primarily for feeding as a winter supplement, along with hay, to the dairy cows and this feeding generally commences in the month of May. On farms where there is a surplus of swedes these may be utilised for the topping off of fat cattle. Good crops of swedes will carry five bullocks to the acre and in the past season swede crops for this purpose realised as much as £25 per acre.

Potatoes: It will be noted that part of field 4 (3 acres) and field 7 are in potatoes, the former following swedes and the latter lea. These again are typical rotations adopted in the area in respect of potatoes. The ploughing of lea land takes place in July-August and swede ground is ploughed as soon as is convenient after the removal of the swedes. The two main varieties grown are King Edward and Arran Chief. Average yields for the district are in the vicinity of 11-13 tons but individual cases are known where yields up to 20 tons per acre have been obtained.

It is from the Inch Clutha area that 95 per cent. of the certified seed potatoes of South Otago are grown and even those growers who do not plant certified seed for potato seed production are conscious of the benefits occurring from the use of certified seed and where possible use certified seed for their commercial crops.

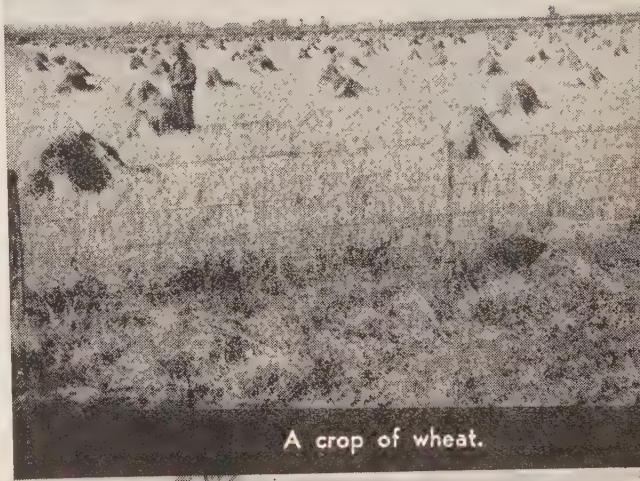
Planting commences from mid-September onwards, but the bulk of the planting is done in early October. The usual cultural operations of scuffling and moulding are carried out at appropriate times, and digging usually commences in early April and extends to the end of May. Crops generally suffer an attack of late blight, but it is rarely that serious damage occurs to the tubers as a result of this fungus disease. Because intercultivation is carried out, potatoes, like swedes, are favoured from the point of weed control. Fathen is the chief offending weed, and if bad, hand pulling is sometimes resorted to.

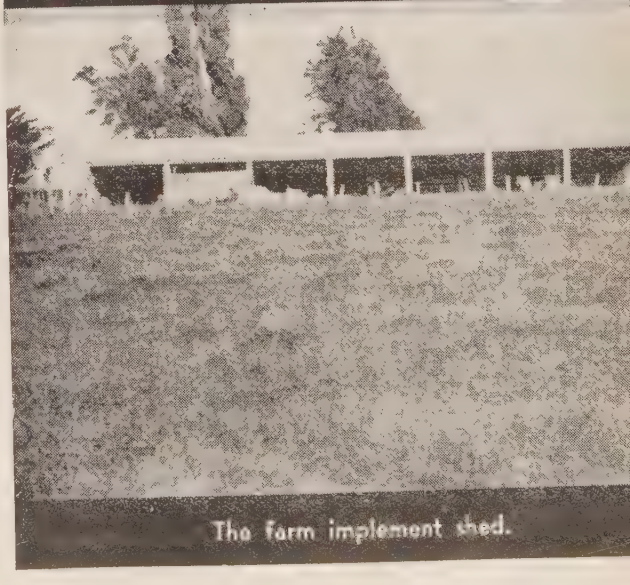
Chou Moellier: The growing of an area of chou moellier for early winter feed is a practice which is now coming into favour. This crop is finding a useful place in so far as it is early maturing, produces a relatively high yield of palatable fodder, and is more resistant to club root than most other brassica crops. On land which is club root infected it is unwise to grow swedes after swedes, but where it is desired that a brassica crop shall follow a brassica chou moellier can often be grown with success and without much interference from club root. With the increase in the acreage of this crop the local farmers, who each year conduct root crop competitions, have considered it wise now to have a competition for chou moellier growing.

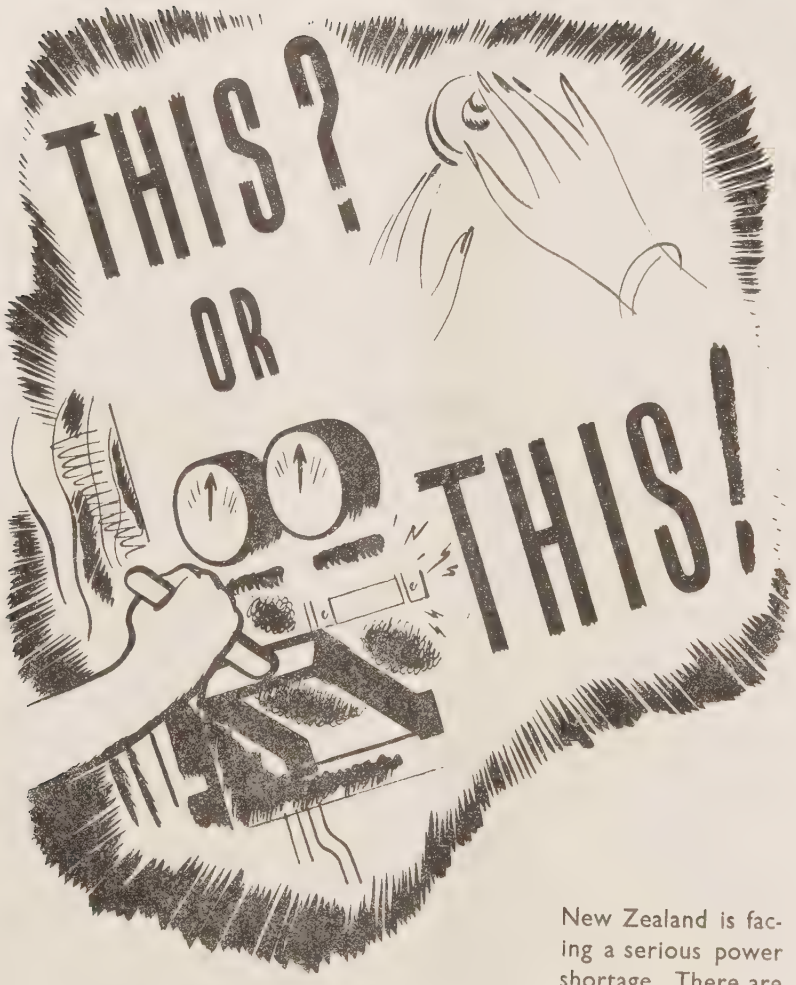
It is customary to sow the chou moellier at the rate of 1½-2 lb. per acre on ridges. Sowing commences from mid- to end October, the seed being ridged in with 3 cwt. of turnip manure. Intercultivation is carried out in the early stages of growth and yields up to 60 tons per acre have been reported. Feeding out to dairy cows may commence from April. The acre of chou moellier and soft turnips in field 4 are for the provision of this early winter feed before the main feeding of hay and swedes commences.

Mangolds: An acreage of mangolds is grown in the district for the provision of a supplementary fodder between the tail-end of the swedes and the commencement of the spring grass growth. Mangolds, which generally follow potatoes or swedes, are sown at the rate of 5-6 lb. per acre on 25 in. to 26 in. ridges, sowing generally commencing in October. The chief varieties grown are Yellow Globe and Red Intermediate, which may yield up to 90 tons per acre.

Chou moellier.


A crop of wheat.


The farm implement shed.



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Pasture Management

From the detailed analysis of the present field utilisation it will be apparent that the ploughing up of pastures occurs every six or seven years. The question no doubt unconsciously being asked is "Why is it necessary on land of such fertility to renew pastures every year?" It is not inferiority of pasture that necessitates ploughing but rather the system of farming being carried out. Were more dairy cows carried pastures might possibly be required to remain down for three or four more years, but then such crops as potatoes would have to be eliminated from the farm programme. The six- and seven-year-old pastures are indeed good, perennial ryegrass, cocksfoot, timothy, white clover, and Montgomery red clover being the dominant pasture species. Weeds are chiefly docks, plantain, chickweed and wireweed. Field 2, of 11 acres, has been in grass for six years and in all probability it will be turned over in July preparatory to being sown in either swedes or potatoes. The establishment of new pastures generally takes place after swedes or potatoes, sowing being done in the spring without any nurse crop.

In pre-war times 14 cwt.-1 ton of lime was customarily sown when the pasture was sown down and during the life of the pasture it would probably receive a further 15 cwt. of carbonate of lime. On the farm under discussion topdressing with 2 cwt. of superphosphate was a common annual practice in pre-war days.

For the efficient winter feeding of stock and for the maintenance of health adequate supplies of hay must be available to the herd and fields from which hay is to be saved are usually closed up in November, thus enabling hay making to be in full swing by January. In the farm under review hay was saved from field 2 (11 acres) this past season. Hay was saved from field 1 (7 acres) and field 8 (8 acres) in 1943 and from fields 5 and 7 in 1942.

It will be seen, therefore, that 11 acres, 15 acres and 16 acres are the areas saved for hay over the past three seasons. The area saved each year for hay will, of course, depend on what the previous year's carry-over has been and the available grass growth during the season.

SUBSCRIPTION RATES.

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PIG MANAGEMENT

Balancing the Feeds

— By —
H. M. PEIRSON,
Acting Superintendent of the Pig Industry, Wellington.

IN EVERY country of the world the first approach the scientist makes to the question of feeding is by way of the composition of feed-stuffs. The amounts of protein, fat, and carbohydrate determine accurately the value of a feed, and a knowledge of them usually accounts for the observed properties of the feed. The man who uses the feed, however, can make little use of the analysis, nor can he take any advantage of the advice so frequently offered that he must use balanced feeds. Not only has the animal a tolerance for a very wide range of quantities—it has an even greater one for a range of qualities. After a short time it can adjust itself to four or even six times the amount of protein that is ideal, and can get along with about half the quantity it should require.

Similarly with minerals—it can live and be healthy with just the minerals found in grain, or it can consume added minerals at the rate of ounces per week. This tolerance is most remarkable while the pig is "idling" and while it has a few reserves stored away in its body. As soon as these reserves become depleted, or when the pig is fed liberally enough to grow, then trouble arises. This takes the form of any of the common ailments from lameness and rickets to constipation, worm infection, or pleurisy. Unsuitable feed that lowers the tone of the animal system is the opening through which most of the ailments of pigs find entry.

Those whose pigs grow satisfactorily but still are subject to certain ailments may dissent from the viewpoint stated above. It is quite possible to get rapid growth on unsuitable feed, but it need not be healthy growth. With unsuitable feeds the more rapid the growth the more unhealthy the animal is—a fact that is made use of in the production of experimental rickets. Even although it is "growth for feed used" that makes a feed supply valuable, growth and good health are a better combination than growth and ill health. The signs of health that are unmistakable are a sleek coat, a shining skin, a bright eye, energetic action, and normal excreta. A feed supply that leaves pigs wanting in any of these, in spite of the fact that the pigs are growing rapidly, is unbalanced and would be improved by the addition of the missing ingredient.

Missing Ingredient

Most people can tell at a glance if their pigs are in normal health, but because of the interplay of many factors such as age, rate of growth, amount of sunlight, presence or absence of parasites, and all the variables that influence a pig's health, it is often difficult to recommend with any measure of assurance treatment that will improve things. Although the value of minerals, condiments, and vitamins is widely recognised, it is most remarkable how many healthy pigs there are in the country that get no added minerals or condiments and live sometimes on skim-milk, sometimes on buttermilk, sometimes on offal, and sometimes on a wide variety of home-grown feeds, plus milk.

This is a small advertisement. It is in keeping with my stocks, which are very low as a result of an ever-increasing deluge of orders. I am having one devil of a job in obtaining regular and adequate supplies, and, unfortunately, the position, unlike whisky, does not improve with age. This applies to both the "BEVIN" HARROW and the "BEVIN" ELECTROFENCER.

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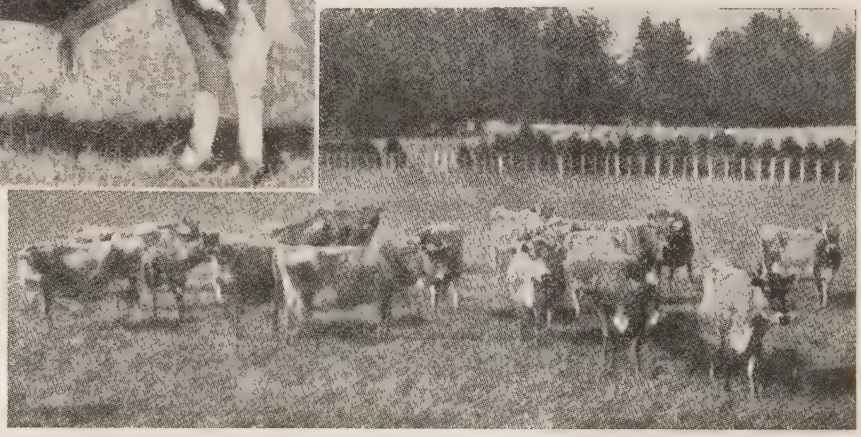
BLOOD WILL TELL, BUT FEEDING WILL SHOW!

(Left)—The sterling young bull, Illawarra Joker, which was first and champion in its class at the Paeroa 1943 Bull Fair, and also first in strong competition at the subsequent Waikato Show. The Illawarra Stud (Mrs. R. Irvine), are fed with "WONDER" from the calf stage.



(Right)—Portion of the well-known Tamaki Jersey Herd, Otahuhu (Mr. C. J. Lovegrove). Tamaki stock is well-known for both stamina and performance, and has produced many outstanding animals. Mr. Lovegrove is also a big and consistent user of "WONDER."

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The common thread that runs through these different places is the care of the owner. He feeds regularly, he feeds just as much as the pigs clean up. His pigs are always looking for more, but never really hungry. He is a careful observer. Any pigs that require attention get it promptly. He is careful to have just the right number of pigs that will use his feed supply at every time of the year, and generally he pays attention to all the details that require attention. As a result one can say with a good deal of conviction, and with no desire to be clever or offensive, that the best supplement that can be used with any feed supply, no matter what its origin, is understanding and care on the part of the owner. It is not everyone's good fortune that he can take care; or put otherwise, things go wrong with some in spite of the best of care. In such cases it becomes necessary to find something that can be added to the ration in order to keep pigs healthy with limited care.

Farmers are entitled to the assistance and advice of the District Pig Council Supervisors. Pig producers have provided the funds to enable these Councils to be set up, and all farmers are urged to take every advantage of these facilities. Applications for assistance should be made to the Department of Agriculture or to District Supervisors as follows:—Whangarei (Box 131); Pukekohe (Box 32); Whakatane (Box 12); Gisborne (Box 316); New Plymouth (Box 131); Palmerston North (Box 80); Dunedin (Box 693); Christchurch (Box 639); Hamilton, Wesley Chambers.

Minerals, Vitamins or ?

One of the most striking happenings associated with pig feeding is the wonderfully sleek appearance of pigs that are being fed on lucerne. Whatever their age or state, after weaning pigs that receive lucerne, green or as chaffed hay, are always sleek and healthy, provided of course that lucerne is not their sole feed. Whether its value lies in the minerals contained in it, or in the vitamins, or the protein value, we will never know, because of the difficulty of separating these things, but the fact remains that lucerne puts a shine on the coat not excelled by any other class of feedstuff.

Next to lucerne ordinary green pasture, provided it is young, keeps pigs quite healthy, and although not so universally excellent as lucerne, it is quite valuable. Next the oil-bearing feeds, such as linseed cake, oats and meat-meal fed in small amounts make pigs healthy-looking, and here again it is impossible to fasten with any assurance on the ingredient that is most useful. Pigs fed on offal—boiled meat scraps—are always remarkably healthy, and one is almost forced to the conclusion that animal fat is most beneficial. Finally there are the well-known benefits that so many have obtained from using mineral mixtures such as wood ashes, charcoal, slack coal, or licks of various kinds containing salt, sulphur, iron, iodine, lime and phosphates.

It seems impossible to make any authoritative statement on the question of minerals. The question was investigated by Sheehy in Northern Ireland some time ago, and over a period of five years after trying every kind of mineral mixture he found that salt and limestone, one part to four, used at the rate of 3 per cent. of the dry weight of feed, was the most useful mineral. A pig of 100 lb. weight, eating 4 lb. of feed or its equivalent, would want daily about 1½ ozs. of minerals. A useful way to feed minerals is to have the supply handy and with a known measure, such as a baking-powder or other tin, put the calculated amount in the trough daily. It sounds very complicated, but it can be done quite easly if it is worth while.

Attention to Detail More Important Than Anything Else.—It is apparent that in spite of the supposed advisability of knowing how much a pig should receive per day and how much protein, fat, carbohydrate and minerals there is in his ration, it is seldom that the good results obtained by a feeder can be ascribed to this knowledge. More usually success is associated with attention to some or all of the following details:—

1. **Feed regularly as to time and amount.**
2. **Feed just as much as the pigs will clean up.**
3. **Don't leave stale food in troughs. Movable troughs can be conveniently turned over. Fixed ones could have a hinged lid that keeps the troughs clean.**
4. **If pigs fail to thrive after attention has been given to the above, then the quality of the feed supply is at fault or the pigs are unhealthy. It always pays to correct the trouble and the improvement of the feed supply is either a matter of adding green grass to the ration or ½ lb. of any grain or ¼ lb. to ½ lb. of meat-meal; or perhaps 1 oz. of lime and salt mixture. Experience usually decides which of these gives results.**

Quality Usually Good

It is rarely that the feed supply itself is of such a quality that it can be blamed for poor pigs. On any place where pigs are kept there may be a dozen healthy pigs for every sick one. It is a fair assumption that the sick one is the result of some chill or setback, such as we humans experience from time to time, and that the dozen healthy ones are a striking advertisement for the excellent quality of the feed supply. This is generally correct for those months of the year when skim-milk is the chief source of feed supply. When skim-milk is in short supply it often happens that most of the pigs go to the pack, either because they have too little feed or else because the quality of their feed is below standard. The feeds in use are usually home grown, varying from grass through any kind of fodder crop to roots of all descriptions, plus at times a little grain. There is one addition, viz., meat-meal, that can be made to every feed supply (skim-milk included) that will always bring feed quality up to a standard that enables pigs to thrive.

Pig Industry Broadcasts

UNDER the auspices of the District Pig Councils concerned broadcasts will be delivered in June as follows:—

Auckland, 1YA—On June 15, at 7.15 p.m., "Litter Production," by H. Preston, Supervisor, Northland District Pig Council.

Dunedin, 4YA—On June 12, at 7.15 p.m., "Avoiding Losses in Pig Production," by M. Roderique, Supervisor, Otago and Southland District Pig Council.

Napier, 2YH—On June 8, at 7.30 p.m., "Litter Production," by I. H. Owtram, Supervisor, Tairawhiti District Pig Council

Palmerston North, 2ZA—On June 20, at 8.30 p.m., "Breeding Programme, or Fitting Pigs to the Feed Supply," by H. Marsdon, Supervisor, Wellington District Pig Council.

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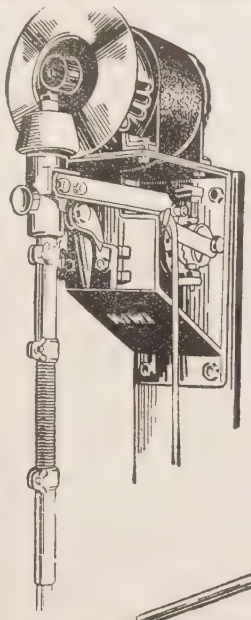

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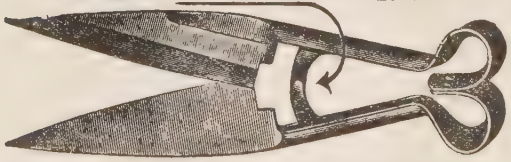

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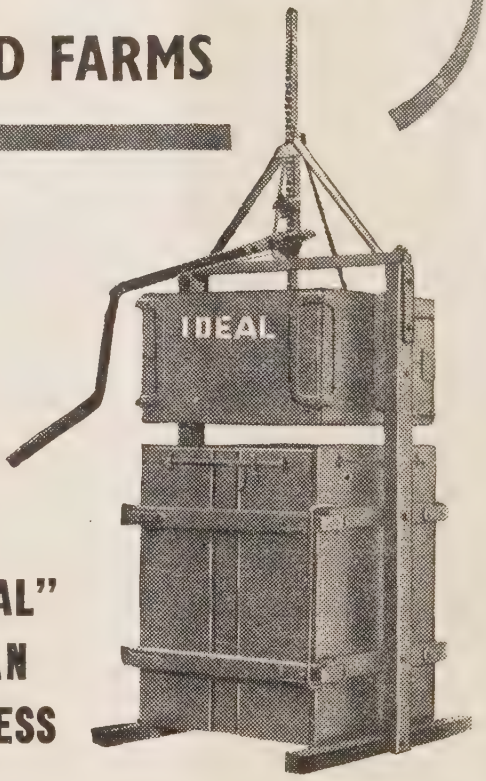

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THE CLOVER CASE-BEARER

Fig. 1.—Adult moth of clover case-bearer with wings spread (enlarged).

Fig. 2.—Egg at base of clover petal (enlarged).

Fig. 3. — Portable case (enlarged) sheltering caterpillar of clover case moth. Case formed from withered petals of clover flower.

Insect Injurious to White Clover Seed

— By —

AVICE HAMILTON,

Divsn. of Entomology, Scientific and Industrial Research Dept., Cawthron Institute, Nelson.

IN the production of clover seed in New Zealand any insect that attacks the plant must be looked upon as of likely economic importance. Recently a small moth (the clover case-bearer) has been found attacking the developing seed of white clover in North Auckland, Hastings, Nelson, Blenheim, Ashburton, Timaru, Waimate, and Oamaru, and is probably widely distributed throughout the country. It is found frequenting white clover on roadsides, in grazed paddocks, and in fields held for seed, but so far has only been observed in large numbers in localised areas.

Life Cycle of Moth

The moth has been accidentally introduced into New Zealand. It is known as the clover case-bearer (*Coleophora spissicornis*), owing to the fact that the caterpillar makes a case out of the withered flowers of the clover.

The moths (Fig. 1) are about a quarter of an inch long with shining brassy-bronze wings, becoming coppery towards the tip. Therefore on bright, sunny mornings they are very conspicuous when settled on the clover flower heads which they frequent for feeding and egg-laying. The female moth lays one or two minute, shining, white eggs (Fig. 2) in a single open unfertilised clover flower or floret. About 89 eggs were laid by one moth.

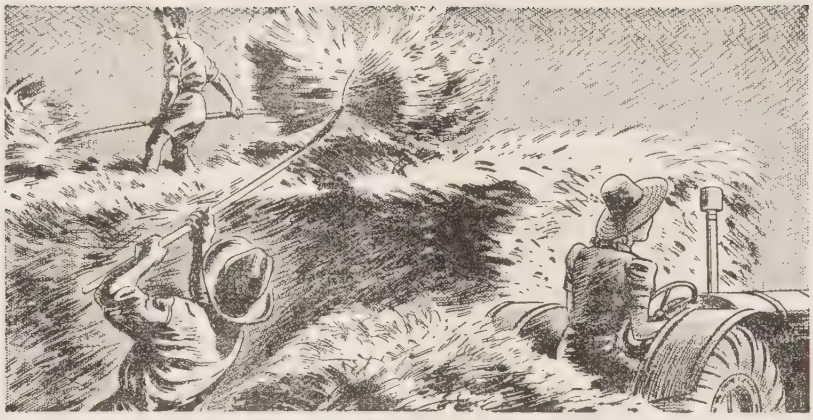
Later, in from nine to 11 days' time, and after the flowers have withered and drooped, a small caterpillar emerges from the eggs and enters the developing seed-pod. This caterpillar having eaten all the seeds in one pod makes a hole through to the next flower and begins feeding upon its seeds. Later, the insect makes itself a portable case out of the withered petals of a flower by weaving them together with silk and severing them from the stalk. These cases (Fig. 3) are approximately 3-16ths of an inch long, of leaf-like texture and dark brown in colour, and tend to be spindle shaped.

Thus the caterpillar spends the remainder of its life within the protecting walls of the case, leaving it only when feeding upon the seeds. When the food supply on one clover head is becoming scarce the caterpillar with its case can drop to a fresh head. These cases are pulled into the clover head among the withered flowers and fastened while the insect bites into a new pod. Therefore they are extremely difficult to find, owing to their similarity to the rest of the withered flowers on the clover head, but often a trail of silken thread is observed leading from a damaged flower. The caterpillar feeds upon the clover seeds during late summer and autumn, then probably retreats into its case and over-winters among the clover plants, or on the surface of the ground. However, it is possible that it will feed again in the spring before changing to the adult moth.

When removed from its case the caterpillar, which is approximately 3-16th in. long (Fig. 4), is found to be light yellow in colour, with a dark

Fig. 4.—Caterpillar removed from case (enlarged).

Fig. 5. — Clover floret or flower showing hole made by caterpillar on its way to the seed pod.



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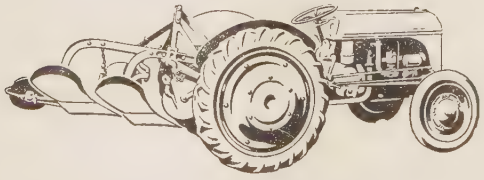

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head and dark markings on the fore end of its body. When the caterpillar has finished feeding it changes to a chrysalid from which the moth later emerges and pushes its way out of the case.

Hosts

In New Zealand the clover case-bearer has been found damaging only white clover seed. Nevertheless, in Europe, it attacks red clover, and may possibly do so here.

A clover head, the flowers of which have been damaged by the caterpillar, has the same appearance as a sound one, except for a few fine strands of silk left along the petals. However, upon closer examination, probably after the head has been slightly rubbed, flowers will be noticed with holes in the side (Fig. 5) which lead through to the seed-pot. The pods will often be found empty, or with only parts of the seeds present. So the caterpillar may either devour the whole seed, leaving no trace in the pod, or partially destroy it. In the latter case only seed coats and parts of the seeds remain. Therefore these damaged seeds usually have a hollowed-out appearance.

According to tests carried out in an area in Denmark, one caterpillar destroyed two to three flowers of red clover in one day; also, samples of clover heads collected from the field showed 14 per cent. to 28 per cent. of the flowers destroyed.

When the white clover is being harvested the majority of the clover-moth cases are thrown out with the unthreshed clover flowers. The damaged seeds are also separated out from the sound ones, so that in first-grade seed there is usually no sign of the presence of the moth.

Most of the distribution records for New Zealand have been obtained from material supplied by the field officers of the Department of Agriculture; Mr. W. C. Davies, Cawthron Institute, took the photographs.

Radio Broadcasts

RADIO talks to farmers will be given from station 1YA, Auckland, at 7.15 p.m. on the following dates:—

June 12—"Virus Diseases of Plants," by Mr. C. H. Proctor, Pathologist, Plant Diseases Division, Auckland.

June 19—"How Certification is Assisting New Zealand Farmers," by Mr. J. H. Claridge, Seed Certification Officer, Department of Agriculture, Wellington.

June 26—"Young Farmers' Clubs' Session," to be arranged by Western Bay of Plenty District Committee.

Lemon Culture in New Zealand

— By —

W. K. DALLAS (N.D.H.N.Z.),
Director, Horticulture Division, Wellington.

(Continued.)

Planting

For heavy or moderately heavy soils that are liable to remain cold and sodden during the winter months spring planting is preferable to autumn planting, since the soil is in better condition after lying fallow during the winter. Further, as the trees are set out in soil which is becoming warmer, the roots soon establish themselves. Autumn planting is suited to most well-drained soils provided the land is well worked prior to planting.

The trees should be planted on the square system, as this facilitates cultivation. Trees to be set out on better-class land should be planted from 22 ft. to 25 ft. apart. The former requires 90 trees per acre and the latter 69 trees per acre. It is not advisable, however, to plant trees closer than 25 ft., as a less distance does not allow for the land between the trees to be effectively worked or cover-crops grown when the trees reach full stature. On less fertile soils they may be planted 20 ft. apart. At this distance 108 trees per acre are required.

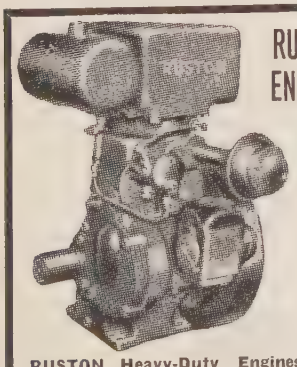
For the purposes of economical working, as well as general appearance, it is important that the trees be planted in lines, so that from whatever point they are viewed the rows look perfectly straight. Full details in connection with the laying-out of an orchard may be obtained from the Horticulture Division, Department of Agriculture, Wellington.

The sites for the trees having been marked with pegs, the holes should be dug and the soil removed and scattered broadcast. Before planting it is advisable to mix lime, superphosphate, and bone-dust together—three of lime, two of superphosphate, and one of bone-dust—and to place six handfuls of the mixture into each hole and work it well into the soil. If not attended to when heeled-in the roots of the young trees should be examined and damaged parts cut off.

In the process of transplanting there is always some loss of roots. The tops should be lightened to balance this loss, as it is difficult to re-establish a tree with a head heavy in proportion to the roots. This may be effected by removing superfluous branches—three to four main branches being sufficient to make the foundation of a tree—or by shortening growths as the case may require, or by both removing and shortening shoots. When a young tree is furnished with spreading roots it is well to make a mound in the centre of the hole, on which to place the tree with the roots pointing down the sides of the mound. The soil for filling in is obtained by digging the surrounding soil forward. The advantage of this method is threefold: it breaks down the walls of the hole, does away with a possible pot-hole for water, and ensures that nothing but top soil will come in contact with the roots. If the soil is of a heavy nature the filling-in should be done with a digging-fork. It is advisable to tread the soil firmly over the roots but to leave the surface soil loose. During the planting operations the roots should not be left exposed to wind or allowed to become dry. To neglect this precaution may cause a loss of trees.

Pruning

In the study of the methods adopted for the pruning of lemon-trees it is found that a great many trees are not pruned sufficiently. While over-pruning is not recommended, the pruning should be sufficient to maintain a fairly open-headed tree furnished with a good supply of thrifty fruiting laterals. Except for the winter and early spring months, pruning may be carried out at any season of the year. The most suitable period, particularly



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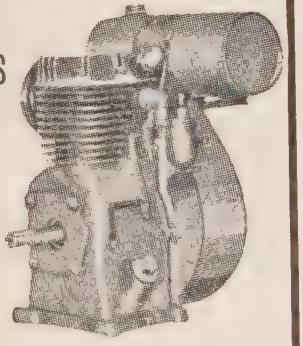

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if heavy cutting has to be resorted to, is in the spring at the commencement of tree-growth, when the wound-gum is present in sufficient quantity to protect the tissues against the entrance of disease through the wounds.

Pruning in the Nursery

The pruning of the tree should begin with the one-year rod from the bud. The height at which the one-year tree should be cut will depend upon the height that it is desired to make the head. For convenience in working the orchard the tendency now is to prune the rod back to a height of about 3 ft. from the ground. It is, however, advisable to cut a little higher for the following reasons: Firstly, it is impossible to be sure of keeping the top shoot. Top shoots are frequently strong in growth, and until well on in the season their hold on the main stem is not too secure. In windy places they are liable to be blown off, which may be disastrous to the development of a well-balanced tree if other suitable branches are not available. Secondly, some trees send up the first shoots too near to the perpendicular. If the young tree is headed a little higher than the top branch is required the upper shoots tend to spread, and so the desired angle to form a broad base to the trees is obtained. Further, there are other branches to select from in case any are blown off.

During the first year after the heading-back of the rod, the shoots which develop should not be touched as the tree needs as much foliage as possible with which to develop a good root-system, strong branches, and to protect the trunk from the sun.

In the second year the branches to form the framework should be selected. Each tree should have from three to four main branches, the distance between the lowest and highest being from 10 in. to 12 in. The lowest branch should be at least 2 ft. from the ground. The branches should be arranged spirally on the trunk and not opposite each other, because when leaders are in whorls they are liable under stress to break away from the trunk. Those branches which are not required should be removed carefully.

Pruning at Time of Planting

Young trees received from the nursery in most instances are branched trees two years from the bud with the head already formed. When the young trees are planted shoots not required should be removed in order to restore

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the balance between the top and the root. Normally the selected branches do not need shortening, but where they have made very strong growth it may be desirable to head them back.

The trunks should be protected from sun-scald either by white-washing or by wrapping newspaper or other suitable material around them.

Pruning of Non-Bearing Trees

During the first three years after planting very little pruning is necessary—merely sufficient to keep the trees upright, to develop a shapely open, balanced head, and to remove superfluous shoots. Branches which are growing strongly to the detriment of others may require heading-in to increase the strength of weaker branches and to induce lateral growth. The trees should have as many leaders as will fully furnish the tree without crowding.

There are a number of methods adopted by growers to develop the framework of the trees. One method which gives a tree of the desired symmetrical form and openness of head is to select three or four leaders, which should be inclined at about a 45 deg. angle. This should be done at the end of the second or the third year after planting, when the trees are well established and strong growth has been made. Of the vertical growths which arise from the leaders two strong well-spaced vertical shoots should be selected. Other vertical shoots should be either kept in subjection or removed, and the leader shortened back to the outside selected vertical growth. Two years later, when the selected shoots have made strong growth, each should be cut back to two suitably placed strong lateral shoots, thus doubling the number of leaders. From the vertical shoots which arise from these laterals one shoot on each should be chosen, and two years later, when these selected shoots have made strong growth, each should be shortened back to a strong lateral growth. The treatment of the past two years should be repeated until the trees reach a height of 10 ft. In most situations the trees should not be allowed to exceed 10 ft. to 12 ft. in height, as such a height allows of much of the fruit being gathered from the ground and of pruning and spraying being more readily carried out. This system of training provides shapely trees, each having from 12 to 16 leaders which should carry heavy crops without undue bending. The centre of the trees should not be allowed to become filled with vigorous shoots.

Young lemon trees should receive attention two or three times a year for the purpose of cutting back branches that are outgrowing the remainder of the tree and to remove suckers, especially should they arise from the trunks of the young trees.

Pruning of Bearing Trees

To maintain a maximum supply of fruiting wood the stronger subsidiary lateral growths should be pinched back to cause them to send out fruiting wood nearer to their base and close to the main branches. Trees with an open centre carry fruit both on the inside as well as on the outside of the trees. The lower growth should be kept well above the ground-level and all straggling shoots and branches cut back to preserve as nearly as possible an even contour in the whole tree. All brush (unthrifty lateral growth), watershoots, and dead and dying wood appearing in the tree should be pruned out entirely. If the wood is young and vigorous the fruit will develop better, and much of it will mature in the summer. Growth that has been injured by frost should be cut back to sound tissue. A fairly open head in the tree fosters fruiting laterals and facilitates effective spraying. When a tree is allowed to grow with little or no attention it may produce a fair crop for a time, but much of the fruit will be on the ends of branches where it is liable to sway with the wind and become rubbed and bruised. Branches may be also broken by the weight of fruit, thus reducing the productiveness of the tree. To keep the mature tree shapely and fruitful it is desirable that it should receive attention at least once a year. Neglected trees are difficult to spray and often become infected with fungous diseases and infested with insect pests to an otherwise avoidable degree.

The Lisbon, being an extremely thorny variety, requires more thorough and regular pruning than the other

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varieties, if fruit is to be obtained free from thorn injury. The inside of the tree must also be made accessible to the picker so that without undue difficulty he may avoid thorn scratches. Thorns on the main limbs should be reduced by pruning at the time of picking.

The Eureka lemon requires more shortening back of the laterals and reduction in tree heights, as its habit of growth is that of a tip-bearer. The lemons set at the end of long lateral growth are blown by every wind, thus resulting in rind abrasions and injury.

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trees. The Meyer is somewhat similar to the sweet orange in its habit of growth—closer headed. In the main the trees require only a thinning out of the shoots, which tend to become dense where annual pruning is neglected.

Tools and Wound-Covering. — Sharp secateurs to enable smooth cuts to be made are essential as are also a sharp saw, and a knife to smooth off the tissues ruptured by the use of the saw. A protective wound-covering should be applied to all wounds over half an inch in diameter.

Gather and Destroy Prunings.—These should be gathered and burnt without undue delay, to get rid of prunings that are diseased, to maintain the general tidiness, and to improve the hygienic conditions pertaining to the orchard.

Cultivation

The depth to which the soil may be cultivated is governed by type of soil and depth of rooting of the trees. As there is a tendency for young lemon-trees to develop roots near the surface the ploughing during the first few years should be relatively deep near the trees. The space around the trees not reached by the plough should be hand-dug, and any roots met with near the surface severed close to the trunk by a clean cut. As the trees increase in size the ploughing should be restricted to the area outside the spread of the trees, and the ground beneath the trees can then only be surface-cultivated. When this stage of the tree development is reached the trees will have a well-established root system in the middle and lower strata of soil. The importance of a good depth of well-cultivated soil cannot be too strongly emphasised, because unless this is provided the roots cannot long remain sufficiently active to maintain growth and produce continuously heavy crops of fruit suitable for commercial purposes.

The amount and character of cultivation, however, given to an orchard must be governed to a large extent by the nature of the soil and the climate. Usually it is best to plough to a depth of from 6 in. to 8 in. in the autumn and cross-plough in the spring. During the summer months the surface should be kept loose with a cultivator, ploughing at that time being inadvisable, as it tends to dry out the soil.

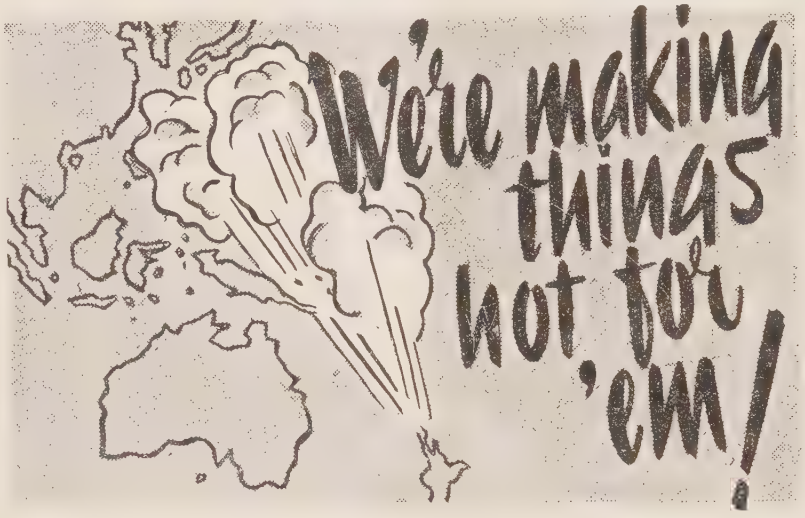
In the autumn the first furrows may be turned up against or towards the trees and an open furrow left in the middle of each "land" between the trees. In the spring the order is reversed, and thus the soil is brought back to its original position. The spring ploughing should be done as early as practicable, either in August or early September, and should cover all weeds and trash lying on the ground. The soil should then be worked down to a fine tilth, which should be maintained throughout the summer. The ground under the trees should be dug over to a depth of from 5 in. to 6 in. at least three times a year. In working soil where the main mass of feeding roots have been allowed to become established close to the surface the depth of cultivation should not be so deep as to cause a serious loss of roots.

The effect of cultivation upon the soil organisms (bacteria, fungi, and protozoa) is often overlooked. It is to these countless silent workers that a rich soil mainly owes its fertility. Thorough aeration, obtained only by cultivation and good drainage, is necessary for the micro-organisms to thrive and carry on their important work of soil improvement.

Cover Crops

For the successful growing of lemons it is essential to have a soil with a high humus-content. Besides assisting with the elaboration of plant-foods, especially nitrogen, organic matter increases the capacity of the soil to retain moisture and improves the aeration of the soil. The humus-content should be built up by green manuring before planting the orchard, and while the trees are young and deep ploughing is possible. To maintain the trees in thrifty condition after they have come into bearing cover-cropping should be continued.

Legumes are most suitable for cover crops, since they grow rapidly and are rich in nitrogenous matter. Those recommended are horse-beans, lupins, vetches, and field peas used either



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alone or in combination with oats. barley, etc. A mixture of equal quantities of superphosphate and carbonate of lime often may be broadcasted profitably with cover crops at the rate of 6 cwt. per acre.

In some districts weed-growth may be sufficient to maintain an adequate humus-content of the soil. During the early summer weeds, on account of their demand upon soil-moisture, should be suppressed, but when early autumn rains are experienced they may be allowed to grow. When the herbage of weeds is allowed to grow it would be good practice to augment it with a legume broadcast early in February to come up in advance of the weeds.

Before ploughing a green crop under it is good practice to cut it into pieces with the discs, as this ensures a more even distribution of the organic matter. A green crop should not be ploughed in while the soil is in a dry state, unless it be in the late autumn with winter rains soon to follow. A fair amount of soil-moisture is necessary to ensure the decay, as when moisture is in scant supply the crop decays very slowly. Green manuring should not be carried out during the later part of the spring or summer, since the bulk of the material may remain undecomposed thus keeping the soil open with a consequent loss of valuable moisture.

It is recognised that a green crop ploughed into the soil may have at first a temporary impoverishing effect, reducing for a time the available nitrogen. It is therefore necessary that green crops should be turned in at a time when the trees are requiring a minimum amount of nitrogen, this being about midwinter. Soil-moisture is usually abundant at this time, and decomposition should be well advanced before the trees reach full activity.

For the first four or five years vegetable crops may be grown between the rows of trees. It usually is advisable to manure for these crops, and they should not be planted so close to the trees as to interfere with the young roots. If these matters are attended to intercropping is beneficial, as the cultivation necessary for the crops improves the condition of the soil. Potatoes, kumaras, tomatoes, peas, beans, and other leguminous crops are suitable.

(To be Continued).

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Chou Moellier and Thousand-Headed Kale

Types and Seed Supplies

— By —

J. H. CLARIDGE, Department of Agriculture, Wellington,
and R. A. CALDER, Agronomy Division, Lincoln.

Two members of the kale species *(Brassica oleracea)* are utilised in New Zealand for stock feeding purposes. The one—thousand-headed kale—produces a relatively high proportion of palatable leaf to unpalatable stem, while the other—chou moellier—has a higher proportion of stem which is markedly palatable to stock.

THE acreage devoted to these two crops, particularly the latter, has extended rapidly of recent years and at present amounts to approximately 60,000 acres. Prior to the outbreak of war practically all the seed required for local sowings was imported from Great Britain, but since that time this country has become self-supporting in regard to the supply of both thousand-headed kale and chou moellier seeds.

Selection of Types

In line with its general crop policy, the Agronomy Division of the Plant Research Bureau commenced, about eight years ago, a study of the types of plants comprising members of the kale family. This study revealed a fairly wide divergence in type of plant in the lines of seed being imported to New Zealand, particularly in the case of chou moellier. It was realised that no improvement in this respect could be expected in locally produced seed unless type selection was undertaken, and accordingly a programme of work was carried out which resulted in the selection and building up of two types of chou moellier and one of thousand-headed kale. Seed of these types is now being multiplied by the Department of Agriculture and the following information and descriptions will give prospective users some idea of the relative performances of the types:—

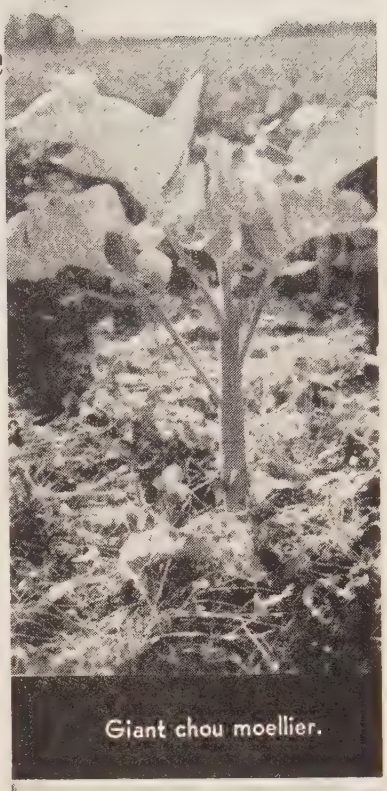
1. Giant chou moellier: A tall growing plant with a smooth, well developed stem, but a rather low proportion of leaf to stem. About 20 per cent. of the plants in lines of imported seed are of this type. The illustration shows Giant chou moellier 3 months from time of sowing.

2. Medium stemmed chou moellier: A plant of medium height with stem rougher and coarser than that of giant chou moellier, but with a higher proportion of leaf to stem. Imported seed is composed of about 35 per cent. of this type. The illustration shows medium stemmed chou moellier 3 months from time of sowing.

3. Thousand-headed kale: This is typical of the true thousand-headed kale, branching freely and having a high proportion of leaf to stem.

In addition to the above-mentioned types of chou moellier, one very similar to the medium type, but rather shorter in growth, is present in considerable quantity in commercial seed, while certain intermediate types are also present. These have all been discarded in favour of the two types described above.

As soon as a sufficient quantity of seed of each of the above described types was available, a trial was undertaken at the Agronomy Division, Lincoln, in order to obtain specific data relating to relative crop yields, leaf to stem ratios and grazing preferences. The trial was sown in 1939, and consisted of eight plots (each 2 ft. 6 in. wide and 45 ft. long) of each type under observation. From February until May, 1940, two plots of each type were studied monthly. Small sub-plots from each plot were cut and weighed, and samples for leaf-stem analyses taken. Six ewes were then allowed to graze the remainder of the plots,



Giant chou moellier.

Medium stemmed chou moellier.

TABLE I.—GREEN WEIGHT YIELDS (in lb. per plot).

Type.	Total Weight.	Weight of Leaf.	Weight of Stem.	Ratio of Leaf to Stem.
Giant chou moellier	35.0 lb.	13.6 lb.	21.4 lb.	39:61
Medium stemmed chou moellier	28.4 „	13.3 „	15.2 „	47:53
Thousand-headed kale	25.5 „	18.0 „	7.5 „	71:29

after which further weighings were made to determine the proportions eaten of each type.

Trial Results

The averaged results on the full series of plots are summarised in the tables I, II, and III.

TABLE I:

1. Giant chou moellier has given the heaviest yield, due to the high proportion of stem in its composition. Its weight of leaf is not significantly different from that of medium stemmed chou moellier, though distinctly lower than that of thousand-headed kale.

2. Thousand-headed kale, though slightly lower in total yield than medium stemmed chou moellier, gave easily the heaviest yield of leaf.

3. The ratio of leaf to stem was distinct for each type, giant chou moellier consisting of three-fifths stem, medium chou moellier being intermediate, and thousand-headed kale being almost three-fourths leaf.

TABLE II:

1. In so far as leaf is concerned, thousand-headed kale gave the greatest weight of material consumed, with little difference between the two types of chou moellier. In each case all the available leaf was eaten.

2. Striking differences are shown in the weight of stem consumed. This was easily the highest in the case of giant chou moellier, while in the case of thousand-headed kale very little stem was eaten.

3. There is little difference in the percentage of total weight consumed of each type, the actual amounts eaten varying according to the total yields obtained.

TABLE III:

The figures in this table show the low proportion of marrow in the stem of thousand-headed kale, the low palatability of which is mainly due to the high proportion of extremely hard woody material contained therein. (See Fig. 1).

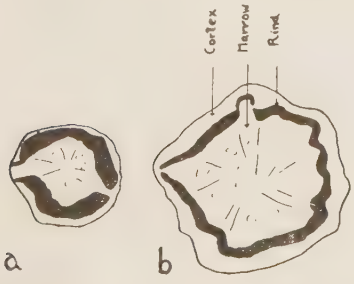


Fig. 1.—Diagrammatic cross-section of the stems of (a) thousand-headed kale and (b) marrow-stem kale, illustrating the relative proportions of cortex, rind, and marrow.

TABLE II.—PROPORTIONS OF THE VARIOUS TYPES EATEN BY SHEEP
(Weights in lb. per plot.)

Type.	*Leaf.* Actual Weight Consumed.	*Leaf.* Percentage Consumed.	*Stem.* Actual Weight Consumed.	*Stem.* Percentage Consumed.	*Total Plant.* Actual Weight Consumed.	*Total Plant.* Percentage Consumed.
Giant chou moellier ..	13.6 lb.	100	15.2 lb.	71	28.8 lb.	82
Medium stemmed chou moellier	13.3 „	100	9.1 „	61	22.4 „	79
Thousand-headed kale	18.0 „	100	1.4 „	18	19.4 „	76

TABLE III.—YIELD OF MARROW IN STEM OF DIFFERENT TYPES.

Type.	Proportion of Marrow in Stem.	Yield of Marrow per Plot.
Giant chou moellier	53%	11.4 lb.
Medium stemmed chou moellier	52%	7.9 „
Thousand-headed kale	37%	2.7 „

It should, of course, be realised that the results discussed apply only for the particular season and conditions under which the trial was conducted. They nevertheless form a useful guide as to the relative behaviour of these types of plants, and should prove of assistance to farmers in coming to a conclusion as to the type which might best suit their particular conditions. For convenience the relative merits of the three types as exhibited in the trial under discussion and confirmed by other observations are summarised as:—

Characteristic.	Giant chou moellier.	Medium stemmed chou moellier.	Thousand-headed kale.
Height	Tallest	Intermediate	Shortest
Type of growth	Most stemmy	Intermediate	Very leafy
Total production	Heaviest	Slightly better than thousand-headed kale	Not quite as good as medium stemmed chou moellier
Portion of stem consumed by sheep	Good proportion of stem	Fair proportion of stem	Very little stem

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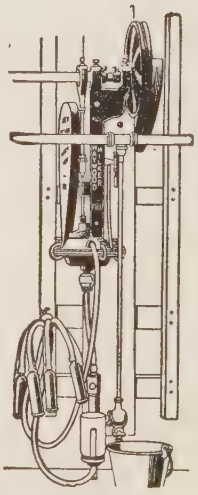

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Crops of giant (left) and medium stemmed (right) chou moellier three months from date of sowing.

One point not recorded in the above tables, but observed in the trial, was that thousand-headed kale seemed more hardy and retained its leaf better than the chou moellier types, thus appearing to be more suitable for late winter or early spring feeding.

While the aim in developing these selections has been to obtain as even a type as possible, complete uniformity has been out of the question and some variation from the typical may be expected in a percentage of plants. Nevertheless the types are easily recognised by the high proportion of plants in each type which conform to the description given.

Certified Seed

Supplies of seed of all types are being multiplied as rapidly as possible, and the Department of Agriculture has made arrangements with one commercial firm in the case of the two types of chou moellier, and with another firm in the case of thousand-headed kale, to undertake the production of seed on a commercial scale and arrange for its distribution through the usual seed trade channels of New Zealand. All the activities of the firms in question relative to the growing and distribution of this seed come under the official supervision of the Department of Agriculture and the seed produced will be distributed under the description "Government Certified."

Subject to no unforeseen circumstances resulting in crop failure there will be available for distribution for sowing in the spring of 1944 certified chou moellier seed of each of the types giant and medium stemmed.

Unfortunately, owing to crop failure, a similar position has not been reached in connection with the selected line of thousand-headed kale seed. As soon as possible, however, seed of this type will also be made available and in the meantime the matter of seed supplies is being met under an arrangement whereby the firm concerned is multiplying, under departmental supervision, the best line of commercial seed available. This seed is distributed under the description "Government Approved," the term "Government Certified" being reserved for seed of the selected strain when supplies become available for distribution in a year or so.

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THE HOME ORCHARD

Combating the Common Insect Pests and Fungus Blights

THIS article is published in response to numerous inquiries from the occupiers of the smaller farm and suburban orchards. The directions are given in an elementary form to suit the special requirements for the control of codling-moth, scale insects, woolly aphis, red mite, black-spot of apples and pears, powdery mildew of apple trees, and peach-curl in such orchards.

The accepted method of dealing effectively with these orchard pests and diseases is that of spraying, different

— By —

The Horticulture Division

sprays being used as required. For instance, the codling-moth grub, which directly feeds upon the fruit, is destroyed by keeping the fruit covered with a film of arsenate of lead during the few months when this pest is active. It has been found that this specific renders the skin, when eaten, toxic to the insect, which is thus destroyed. On the other hand, scale insects, woolly aphis, and red mite feed upon the juices of the fruit, stem, and foliage by means of a beak which penetrates the surface and sucks up the natural juices of the plant. For such pests, it will readily be seen, arsenate of lead would be useless as a remedy. The present method is to destroy them with a contact spray, which is effective as soon as they receive a coating of the mixture, this being generally of a caustic or oily nature.

Black-spot on the apple and pear is a blemish of the surface of the fruit, which is not due to insects at all, but a parasitic fungus, for the prevention of which a different spray, again, must be used. During the period of the year when this blight is prevalent it is customary to cover the surface of the fruit tree with a spray, which prevents the almost invisible spores of the fungus from germinating and establishing themselves in the fruit or leaves.

POWDERY MILDEW.

Powdery mildew attacks the leaves, shoots, blossom buds, and also causes a web-like russet on affected fruits. On the foliage it appears as greyish, cob-webby patches, giving the affected areas the appearance of having been dusted with flour. The affected shoots take on a white, glistening appearance, become bare of foliage, and ultimately die. Infected blossom buds become covered with a greyish-coloured mycelium of the fungus. The diseased blossom bud clusters are usually smaller in size than the healthy clusters and rarely set fruit.

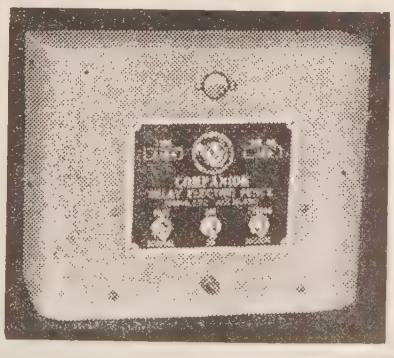
The early spring prior to the "petal-fall" stage of the flower is the appropriate period to apply sprays for the control of this disease. Sulphur sprays, such as lime-sulphur and colloidal sulphur, are the specifics recommended to keep this disease in check.

Money and time are often spent on spraying without obtaining the expected results. This is because it is not properly performed. A few points which will make for effective work are given here.

SPRAY-PUMPS.

The effective spraying of the home orchard requires a pump in good order. For a few trees the well-known bucket pump is quite suitable, but it should be clean, and the packing and unions tight. The small length of hose usually supplied with the pump is unsuitable for orchard spraying. Eight feet of good ¼in. hose and a 4ft. directing-rod improve the outfit very much.

To do good work requires one person to carry the bucket of spray and pump and another to apply the spray to the trees. This operation must be done thoroughly and systematically, for most of the pests and diseases shelter in the angles of twigs, under the leaves, and in abrasions of the bark of the tree. Commence at the



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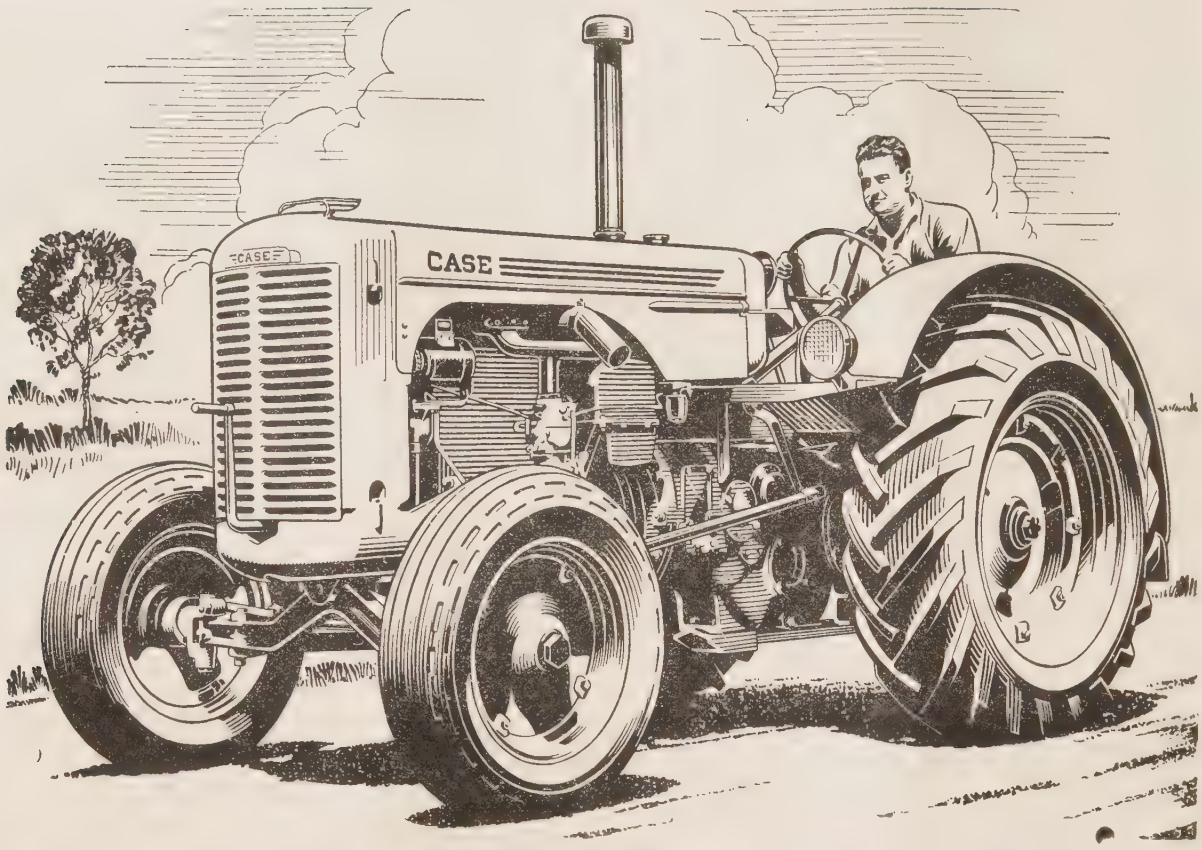

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top and work downwards giving as much attention to the inside of the trees as is given to the outside parts. Consider the windage, and work in dull weather or afternoons if possible. For larger areas a barrel pump is more suitable than the bucket pump.

ATTENTION TO DETAILS.

Another important point affecting results is the preparation of sprays. Buckets used for oil should not be used for bordeaux mixture or lime-sulphur without being washed, or vice versa; it is a good plan to keep separate vessels for the purpose. Weighing and measuring of ingredients must be accurate. A little too much or too little may burn the trees and cause loss of the crop. When mixing have a batten handy to stir the mixture well, and again occasionally, while applying it, so as to prevent any settlement of the ingredients.

SPRAY AT RIGHT TIME.

To be effective sprays must be applied at the right time. Codling-grubs are feeding in November, and are about until February and March, the period varying slightly with locality. Scale insects are dealt with at almost any time, but are more easily destroyed in early spring just before their eggs begin to hatch. Woolly aphis is most dangerous in autumn, when winged emigrants appear, which establish new colonies.

Red-mite eggs, which are often found about the base of leaves and twigs, hatch in early spring, and egg-laying is active about the month of March in such places; effective work can be done by spraying at these times. Black-spot spores issue in early spring from the fungus wintering on leaves and branches, and settling on the leaves and fruit, under suitable conditions, make root-like growth which penetrate the tissues of the host. Usually the most dangerous period is during September, October, and November.

Powdery mildew spores become active early in the spring at the time the buds are swelling. Suitable measures taken during September, October, November, and December will do much to control this trouble.

These facts are given to show the importance of spraying at the time mentioned in the directions which follow.

CODLING-MOTH.

Considerable loss results each season from the depredations of codling-moth in apples, pears, and quinces. This can easily be remedied by careful and systematic spraying with arsenate of lead. Although it may not appear so, codling-moth is one of the easiest insect pests in the orchard to control, always provided that the main principles are adhered to—namely, correct strength of arsenate of lead and thoroughness of applications at the correct times.

Stages of Apple-Blossom Development: (1) Green-tip; (2) tight-cluster; (3) open-cluster; (4) pink; (5) full-bloom; (6) petal-fall; (7) calyx-closed.

{Drawing by N. J. Adamson.

A knowledge of the habits of this insect at once indicates a method of intelligent control. We have learned that (1) it lives by eating the fruit, therefore we cover the latter with a weak poison, such as arsenate of lead, thereby destroying the grub; (2) the grubs hatch in late spring, and through summer from eggs laid by the female moth on the young forming fruit or leaves, consequently we commence spraying the young forming fruit early, and continue at frequent intervals throughout the summer; (3) as a large proportion of the grubs enter through the eye or calyx end, we endeavour to fill the calyx cavity with spray before it finally closes; (4) the grub changes into a moth, the female of which will lay eggs to hatch into more grubs, and we must therefore destroy all grubby fruit to reduce the numbers for further infection.

SPRAYING TREATMENT.

From these considerations, therefore, the following spraying treatment is recommended:

Proportions.—Arsenate of lead powder form, 1oz. (if in paste form 2oz.); water, 4 gallons.

Preparation.—Weigh out 1oz. of arsenate of lead (powder) and place in a small vessel; slowly add a very small quantity of water, mixing thoroughly all the time. When the whole is about the consistency of milk pour into a kerosene-tin or other vessel and make up to 4 gallons of water. This wash requires to be frequently stirred while being used.

Application.—Spray when two-thirds of the blossoms have fallen, with considerable pressure, and force the liquid into the "eyes" of the young fruit. Repeat every three weeks until February. Future applications will depend on district and

climatic conditions. Usually it is necessary to spray towards the middle of February, and in some of the northern districts again a month later. These late sprayings, in conjunction with the earlier ones, are also necessary for the control of leaf-roller caterpillar.

In addition to the spraying treatment advocated, it is absolutely necessary to gather all grubby fruit from the trees and ground as soon as they appear infested, so that it may be destroyed before the grub leaves it.

SCALE INSECTS.

Scales, being sucking-insects, are found adhering to the bark of the tree or to the surface of the fruit and leaves, and are mostly armoured—that is, covered by a natural shell-like shield.

Mussel Scale.—This is a scale which attacks the apple, pear, and plum, and where neglected treatment gives considerable trouble to orchardists throughout the Dominion. If its presence is not detected and speedy and effective steps taken for its control, it spreads very rapidly, a large number of eggs being produced by the female insect during the season.

Maire Scale.—A native scale attacking deciduous and citrus fruit trees, ornamental trees, and shrubs generally. Infection from this pest spreads very rapidly. The scale is somewhat round, of a dirty-greyish colour, and usually about the size of a large pin-head.

San Jose Scale.—A troublesome insect pest attacking both stone and pip fruits, and one which may be considered to cause considerable damage in the orchard if not detected and effectively controlled. This scale, as compared in size with those already mentioned, is miniature, is of a greyish-white colour, and circular. Upon close examination it may be found that the immediate centre is a yellowish colour, and in this respect it is easily distinguishable from the other scale insects mentioned herein.

Treatment. — The above-mentioned scales on deciduous fruit trees are easily controlled by spraying with winter-oil emulsion, 3 pints to 4 gallons of water, during the dormant season, preferably in July. However, if this spray has been omitted the young scales may be killed in the early summer, while they are on the move and before their shell forms and hardens, with summer-oil ½ pint to 4 gallons of water, or nicotine sulphate (40 per cent. standard) four-fifths of a fluid ounce (five teaspoonfuls to 4 gallons water), first dissolving 2oz. common soap in the water.

WOOLLY APHIS.

This is an insect pest too well known to need much description. It attacks many varieties of apples, and is most destructive. Its appearance is easily noticeable—a white woolly substance forming on the parts of the tree attacked. Infestation generally commences on the young wood or at the base of a leaf-stalk—the insect penetrating the wood tissues and sucking the plant-juices therefrom, causing the formation of warty growths on the parts affected. The insect increases rapidly, and, being protected naturally by the woolly substance and also by the growths and crevices caused by its attack, it is very necessary in combating this pest by spraying that the compound used should be applied with considerable force in order that the insect may be well reached.

Spraying is recommended as follows:—During the dormant season, with winter-oil at a strength of 3 pints in 4 gallons of water; and during summer months, with summer-oil ½ pint to 4 gallons of water; or with nicotine sulphate (40 per cent. standard) four-fifths of a fluid ounce (five teaspoonfuls to 4 gallons of water) to which is added 1oz. of arsenate of lead (powdered form). Soap should not be used in this combination.

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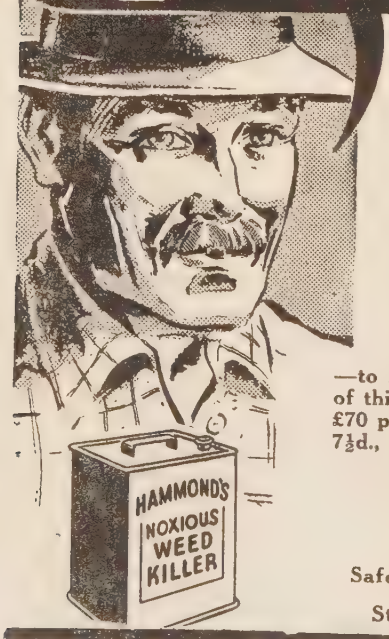

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RED MITE.

This pest, like the scales, is a sucking-insect living on the plant-juices of the leaves during the summer, and harbouring during the winter months in crevices in the bark or under forks of the branches, etc., on apple and stone-fruit trees. The insect itself is very small, brick-red in colour, and increases very rapidly. When neglected, the affected leaves are distinguishable at a considerable distance by their sickly appearance, and eventually drop off.

On apple trees the treatment during the winter is similar to that advocated for woolly aphis—namely, spraying with winter-oil emulsion at a strength of 3 pints in 4 gallons of water. For stone-fruits use 2 pints of oil in 4 gallons of water.

For summer treatment spray with summer-oil ½ pint to 4 gallons of water, or with lime-sulphur 1-180 (equivalent to 4 fluid ounces to 4 gallons of water) several times at short intervals. It is advisable to allow an interval of at least three weeks to elapse between the applications of sulphurs and of summer-oil in order to avoid injury to the leaves.

FUNGUS BLIGHTS.

Fungus blights include black-spot on apples and pears, powdery mildew on apples, and leaf-curl on peaches and nectarines.

Black-spot (Apples).—This fungus winters on the fallen leaves, and when conditions are suitable in early spring spores develop. These latter settle on the leaflets at the base of the cluster of buds (known as blossom-buds) where the spores germinate and in due course attack the fruits.

The spraying is directed to prevent their germination.

APPLES.

The following spray treatment for black-spot and powdery mildew control on apples is recommended:—

(a) For Cox's Orange Pippin, Sturmer Pippin, and other tender-skinned varieties—

(1) Green-tip: Lime-sulphur 1 pint to 4 gallons water.

(2) Tight cluster of blossom buds (pre-pink stage): Lime-sulphur 8 fluid ounces to 4 gallons of water.

(3) Pink: Lime-sulphur 4 fluid ounces plus colloidal sulphur 1oz. (weight) to 4 gallons water.

(4) Petal-fall (when about 75 per cent. of petals have fallen): Lime-sulphur 4 fluid ounces plus colloidal sulphur 1oz. (weight) to 4 gallons water.

(5) Remainder of summer: Repeat No. 4 application at about eighteen-day intervals, according to weather conditions.

(b) For other varieties it is recommended that Bordeaux mixture (5-4-50) be applied at "green-tip" stage. To make this, use bluestone 6½oz., burnt lime, unslaked, 5¼oz., and water 4 gallons. Subsequent treatment should be carried out during the season on the lines outlined above.

Black-spot (Pears).—The attack of this fungus is similar to that of black-spot on apples.

PEARS.

The following spray treatment is recommended for control of black-spot:—

(a) For Winter Cole, Josephine, and other Tender Varieties of Pears—

(1) Green-tip: Bordeaux mixture (5-4-50) lime.

(2) Tight cluster of blossom buds: Lime-sulphur 8 fluid ounces to 4 gallons water.

(3) Pink: Lime-sulphur 8 fluid ounces to 4 gallons water.

(4) Petal-fall (when about 75 per cent. of petals have fallen): Lime-sulphur 4 fluid ounces to 4 gallons water.

(5) Calyx (within ten to fourteen days petal-fall): Lime-sulphur 4 fluid ounces to 4 gallons water.

(6) Remainder of summer: Repeat application No. 5 at about eighteen-day intervals according to weather conditions.

(b) Other varieties of Pears—

(1) Green-tip: Bordeaux mixture (5-4-50). To make, use bluestone 6½oz., burnt lime (unslaked) 5¼oz., and water 4 gallons.

(2) Tight cluster of blossom buds (pre-pink stage): Bordeaux mixture (3-4-50). To make, use bluestone 4oz., burnt lime (unslaked) 5oz., and water 4 gallons.

(3) Pink: Bordeaux mixture (3-4-50).

(4) Petal-fall: Bordeaux mixture (2-3-50). To make, use bluestone 2½oz., burnt lime (unslaked) 4oz., and water 4 gallons.

(5) Calyx (within ten to fourteen days petal-fall): Bordeaux mixture (2-3-50).

(6) Remainder of summer: Bordeaux mixture 1½-3-50. To make, use bluestone 2oz., burnt lime (unslaked) 4oz., and water 4 gallons.

Leaf-curl (Peaches and Nectarines).—The fungus causing this disease commences to become active at the "green-tip" stage of leaf-bud development in early spring, and is most troublesome during cold, wet seasons. It is readily held in check by spraying the trees in spring when the buds are swelling. Bordeaux at the following strength is advised:—Bluestone, 6½oz.; burnt lime, 5¼oz.; water, 4 gallons, mixed as directed.

An alternative treatment for leaf-curl is as follows:—Winter formula—Lime-sulphur, 2 pints; water, 4 gallons.

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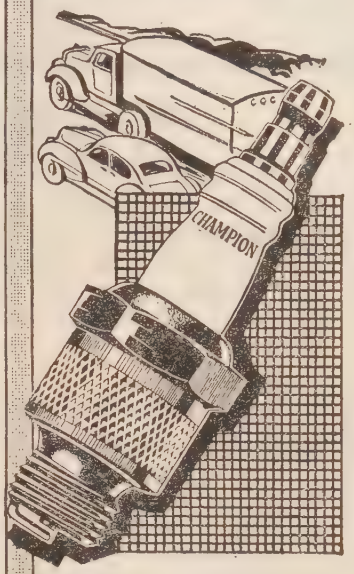

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PREPARATION OF BORDEAUX MIXTURE.

The following directions apply to the quantities of bluestone and lime already given:—

Dissolve the bluestone in 2 gallons of water; slake the lime slowly in another vessel, and make up to 2 gallons; then pour both solutions **simultaneously** into a third vesel. In using the mixture during the dormant season it should show a slight acid reaction—that is, when tested with litmus paper.

Bluestone is readily soluble when placed in a piece of sacking and allowed to touch the surface of the water or suspended an inch or so below it, or by using hot water.

The efficiency of Bordeaux mixture depends upon the intimate blending of the two solutions obtained by pouring both of them simultaneously into a third vessel. It is imperative that the chemicals used be pure and the lime fresh. The best results are obtained when the application is made as soon as possible after blending the two solutions. If allowed to stand for more than eight hours the fungicidal properties of the mixture largely depreciate.

COMBINATION SPRAY.

Lead arsenate + lime-sulphur: Addition of hydrated lime to avoid spray burn to the foliage.

Dilute the required volume of lime-sulphur in four gallons of water; to the required quantity of lead arsenate add twice its weight of hydrated lime; mix with water to form a thin paste, and pour it into the container holding the diluted lime-sulphur, stirring the spray while this is being done. Apply as rapidly as possible after mixing.

Where to get local information on pest and disease control.—Any further advice required may be obtained from the Department's Orchard Instructor for the district. **Remember,** careful attention to simple instructions will enable the home gardener to avoid damage to his trees and obtain the satisfaction of gathering clean fruit.

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Concrete on the Farm

WIDE RANGE OF USES

By

J. A. S. MILLER,
Instructor in Agriculture,
Wellington.

ALTHOUGH concrete has been used for hundreds of years as a building material, its application to farming is of comparatively recent origin, and each day we find a new use for this very durable and efficient substance. Its use in the construction of floors, tanks, silos, troughs, fence-posts, paths, buildings, pipes, field drains, etc., is well recognised and there are few farmers who have not at some time laid down a path or constructed a trough in concrete.

The advantages of concrete lie in the fact that it is relatively cheap to use, easy to prepare, and, once placed, is there for years.

Types of Concrete

There are two main types of concrete, namely, plain concrete and reinforced or ferro-concrete. Although plain concrete will resist a considerable crushing force—that is, 600 to 750 lb. per square inch safe load—it will not withstand a bending force of any great dimensions. For instance, unreinforced concrete beams would break because of their own weight with no loading. To overcome this difficulty, concrete requires to be reinforced, and steel, having a tensile strength of about 18,000 lb. per square inch, is ideal for this purpose. A combination of the two, concrete and steel, results in a body of considerable strength, but the steel must be placed in a position where it will take the appropriate strain. **Indiscriminate reinforcing is useless.**

Main Ingredients

Concrete consists of three main ingredients, namely:—

(1) Cement.
(2) Aggregate.
(3) Water.

CEMENT.

There are three varieties of portland cement used in New Zealand, and all three are put up in bags of 124½ lb. net, that is, 18 bags to the ton.

(a) **Normal Portland Cement.**—This is the usual type and is familiar to all.

(b) **Rapid Hardening Portland Cement.**—"Rapid hardening" must be taken literally, not to mean "rapid setting." It takes as long to set as the ordinary variety but, once set, hardens much more rapidly. In a similar mix it is as strong in one week as normal cement would be in four weeks.

(c) **Water-proofed Portland Cement.**—This cement contains a water-proofing agent which renders it invaluable for cellars, damp-proof walls, etc. Its mixing proportions are the same as for ordinary cement, but it requires slightly longer to set. It has also the property of being little affected by "air setting" while in storage.

All three of the above cements can be mixed at random, that is, they will blend without any disturbing chemical reaction.

Kinds of Aggregate

Aggregate.—This forms the bulk of the concrete, and is divided into the two main heads:—

(a) Coarse Aggregate.
(b) Fine Aggregate.

Coarse aggregate generally consists of gravel ranging in size from ¼ in. to 3 in. or more, depending on the nature of the work. For walls and similar structures, the ratio of the size of the stones to the thickness of the material can be considered as 1 to 5, that is, for a 5 in. wall the maximum diameter of the stones should not exceed 1 in. In plain concrete work such as floors and yards the ratio may be 1 to 3, that is, a 6 in. floor may contain stones up to 2 in. diameter.

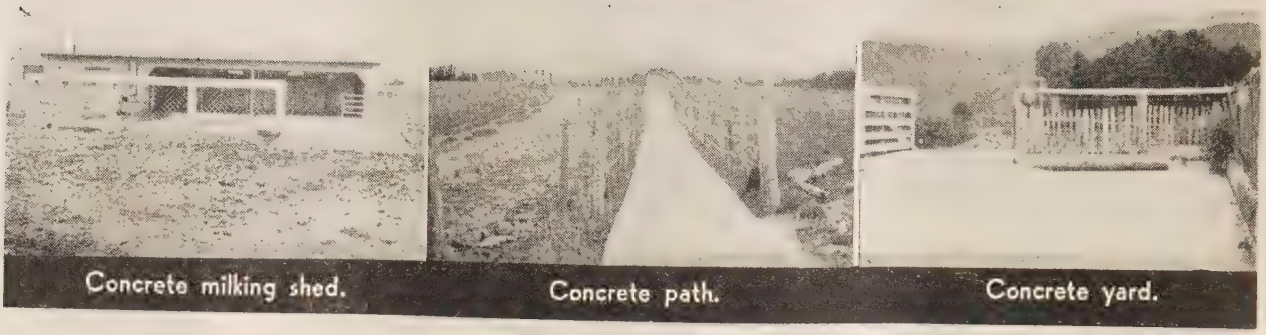
In mass concrete work it is not generally economical to try to mix in stones of a greater diameter than 3 in. because of the difficulty of working with shovel or mixer. Sometimes in bulky work where it is desired to save concrete, massive stones or "plums" are inserted in newly-laid concrete, but these must not be closer together than 2 in., otherwise the strength of the material may be impaired.

Fine aggregate consists of fine, clean sand, and this is required to fill up the spaces between the stones of the coarse aggregate.

Water.—Water used in mixing concrete should be of a standard such as that required for livestock. Where fresh water is unavailable, sea water may be used, but the resulting concrete often shows an efflorescence, and has a "mouldy" appearance.

Amount of Water

Proportions.—It has been shown that the amount of water used to a given quantity of cement has a direct bearing on the strength of the resulting material, provided, of course, that the consistency of the mix is the same in both cases, that is to say, 1 bag of cement mixed with 6 gallons of water would produce a mix which would be twice as strong as one prepared from 1 bag of cement to 10 gallons of water. It will be understood, of course, that the 6-gallon mixture will not produce as much concrete as the 10-gallon mixture.



Concrete milking shed. Concrete path. Concrete yard.

When considering the amount of water to be used in a given mix, it must be borne in mind that water is usually present in the sand or gravel and this must be deducted from the total amount of water to be added. For example, damp sand may be taken to contain ¼ gallon of water per cubic foot, ½ gallon when moderately wet, and ¾ gallon when wet. The amount of water in coarse gravel may be neglected if it is only damp but may be taken as ¼ gallon per cubic foot when it is wet. When mixing sand and gravel, an intermediate amount of water must be allowed for. The information given above must be considered when examining the examples and tables following.

For ordinary good concrete such as that required in the construction of paths, cow-yards, floors, and walls, satisfactory results may be obtained by using about 8 gallons of mixing water to each bag of portland cement (124½ lb. net) and then mixing in as much of the aggregate as is required for good consistency. With average ¾ in. aggregate, the above will generally yield about 7 cubic feet of set concrete for each bag of cement used.

Extra Strong Concrete

For extra strong concrete, such as that required for hard-wearing floors, tanks, troughs, etc., or resistance to milk acid attack, a mix of not more than 6 gallons of water to each bag of

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If material used is graded in size up to:	Quantities to mix with one bag cement and 6 gallons water. Sand, moist loose measurement.	Gravel (or metal), loose measurement.	OR Sand and Gravel if already mixed, loose measurement.	Amount of concrete to be expected (approximately)
Sand only	4 cubic feet	—	4½ cubic feet	3½ cubic feet
⅜ in.	2¼ „ „	4 cubic feet	4¾ „ „	4¼ „ „
½ in.	2¼ „ „	4¼ „ „	5 „ „	4½ „ „
¾ in.	2¼ „ „	4½ „ „	5⅛ „ „	5 „ „
1 in.	2¼ „ „	5¼ „ „	5⅜ „ „	5¼ „ „
1½ in.	2¼ „ „	5⅛ „ „	5⅝ „ „	5⅝ „ „
2 in.	2¼ „ „	5⅜ „ „	5⅞ „ „	5¾ „ „
3 in.	2¼ „ „	5¼ „ „	6 „ „	6 „ „

ORDINARY GOOD CONCRETE.

If material used is graded in size up to:	Quantities to mix with one bag cement and 8 gallons water. Sand, moist loose measurement.	Gravel (or metal), loose measurement.	OR Sand and Gravel if already mixed, loose measurement.	Amount of concrete to be expected (approximately).
Sand only	6¼ cubic feet	—	7½ cubic feet	4⅜ cubic feet
⅜ in.	4 „	6 cubic feet	7½ „ „	6¼ „ „
½ in.	4 „ „	6½ „ „	8 „ „	6⅜ „ „
¾ in.	4 „	7⅛ „ „	8¼ „ „	7 „ „
1 in.	4 „ „	7¾ „ „	8½ „ „	7⅛ „ „
1½ in.	4 „ „	8¼ „ „	8¾ „ „	7¾ „ „
2 in.	4 „ „	8¼ „ „	9 „ „	8 „ „
3 in.	4 „ „	8¼ „ „		8¼ „ „

cement should be used. In this case only about 5 cubic feet of set concrete will be obtained by using ¾ inch aggregate.

These proportions are the limits to which it will be found necessary to go in constructing any type of article such as is likely to be used in farming practices. Fence posts are satisfactorily made from a mix containing 7 gallons of water to each bag of cement.

The size of the aggregate used will depend on the concrete work on hand, or on the size available.

This table holds good only in cases where "pure" materials are used. The gravel, for instance, is considered to be free from sand. However, in most cases the gravel will be found to contain a certain amount of sand, and the table will have to be adjusted accordingly. This is done by trying out a sample of the proposed mix.

Suppose we have an aggregate of ¾ in. average size which we require to make into ordinary good concrete, a glance at the table shows that we require 7¼ cubic feet of gravel and 4 cubic feet of sand to each bag of cement. On mixing together (without the cement) they should give a total volume of 8 cubic feet. If the result gives a return of more or less than 8 cubic feet, the amount of sand or gravel must be adjusted accordingly, the aim being to have the concrete nicely workable.

Means of Measurement

Of course it is not necessary to use the cubic foot as a measurement of volume. A tin of, say, one gallon capacity, would be satisfactory, that is, we could mix 7¼ tins of gravel with 4 of sand and we should get 8 tins of mixture. The materials used must be moist and should not be compressed into the tins, but put in loosely.

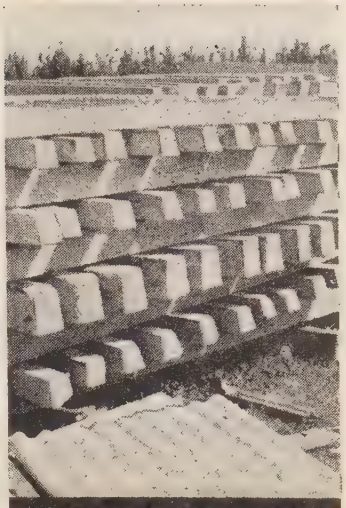
If, on mixing, it is found that the concrete is too stiff to work after the addition of all the water, the amount of water must not be increased—rather the amount of aggregate be reduced, and vice versa, if the concrete is too sloppy, increase the amount of aggregate.

Mixing

A good firm surface such as that obtained by using a wooden platform or a concrete floor is required for hand mixing. Tongued and grooved Oregon is generally used, and a size of about 8 ft. by 6 ft. is required for a one-bag mix.

The coarse aggregate should be spread over the platform or floor to a depth of about six inches, the sand spread evenly over this, and the cement over the whole surface. The heap should be turned over twice dry, and three times while wetting. The measured quantity of water is usually applied through an ordinary watering can fitted with a rose. There should be no patches of dry material left after the mixing.

When a mixer is used most of the water should be poured into the drum to be followed by half the aggregate, the cement, and then the remainder of the aggregate—all this while the drum is revolving. About two minutes are required to complete the process, but this is the minimum, and more time should be given, if possible, as the longer the concrete is kept mixing the finer will be the resulting material.



Concrete fence posts.

Fence erected.

Concrete and netting fence.

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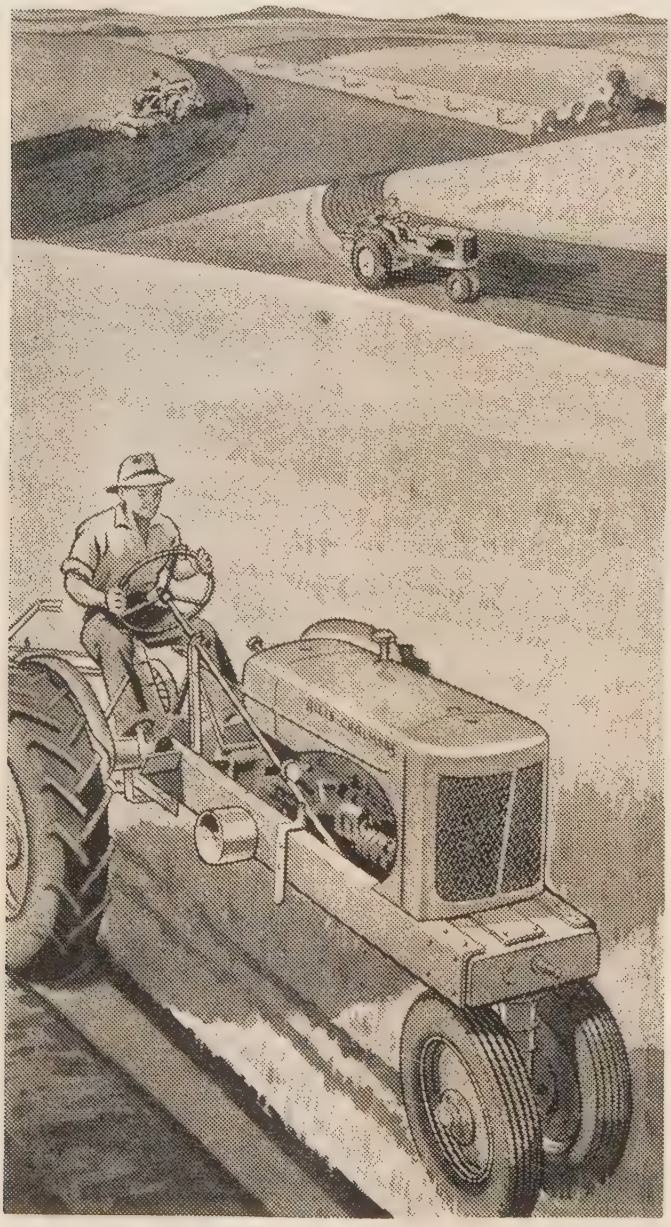

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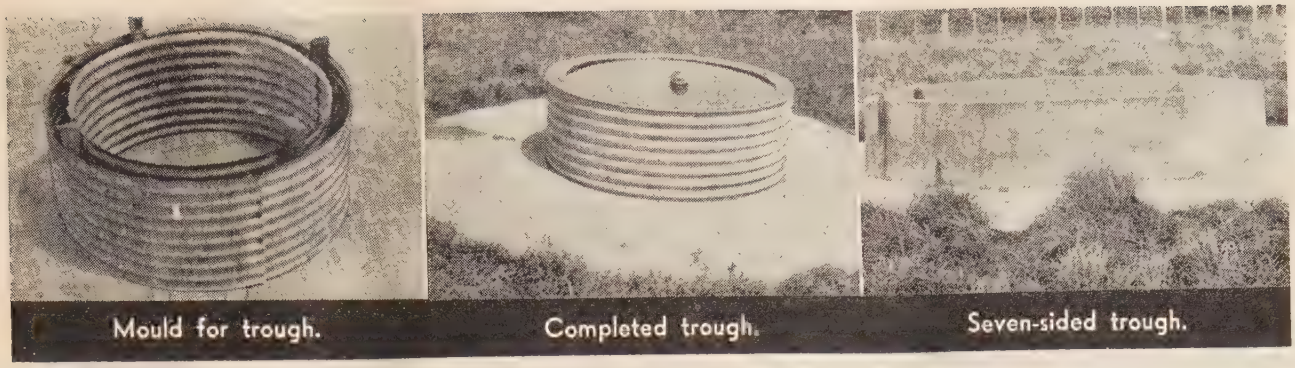

Mould for trough. Completed trough. Seven-sided trough.

The remaining water should be added from time to time if required. Retaining some of the water also ensures that the mix will not be too sloppy. For larger mixers filled with a hoist, the aggregate is generally placed at the bottom of the hopper to be followed by the cement and then the sand, the whole being deposited in the drum which already contains the mixing water.

Placing

In placing concrete for floors and yards, all that is necessary is to ensure that the material is well compacted. It is generally beaten down with a heavy wooden straight edge, and then smoothed off with a wooden float. The final touch is given when the concrete is losing its glossy appearance (about two hours after placing). For a smooth surface, a steel float is used, and for a rough surface a wooden float, or even a stiff broom is used where a really rough surface is required, as in the case of sloping paths, etc.

Concrete in moulds, as for example those used in the construction of walls, requires compacting in the same manner. As reinforcing will be used in practically every case, a large faced tool or rammer is useless, and a steel rod of 3-8 in. diameter is used. This tool should have a rounded end. Another means of attaining a compacting of the material is that derived from tapping the outside of the boxing with a hammer, but this should be supplementary to the actual ramming.

Curing

Although concrete may appear hard and "set" after a day or so, in actual fact it may take some months to become properly matured. Drying-out of the concrete in an effort to hasten the process is quite a mistake, as concrete actually requires moisture in order to complete the chemical reaction necessary to produce the final substance. This is why it is necessary to protect newly-placed concrete from excessive drying-out. Paths and floors should be covered with damp bags for at least seven days with ordinary cement—the longer the period, the better for the concrete.

In walls, the boxing has the effect of protecting the concrete from excessive drying, and should be left on as long as practicable. Warmth also is necessary in the curing of concrete, and the best concrete may be prepared when the temperature of all the ingredients approximates 70 degrees Fahrenheit. Under winter conditions, concrete may take twice as long to mature, and actual freezing of the material in its early stages will entirely ruin it.

As most farmers find time to do their concreting work only during the winter months, they frequently run the risk of having their efforts rendered useless as a result of adverse weather conditions, such as a series of frosts. This difficulty may be overcome to a certain extent by heating the mixing water and using it hot—not boiling. Even moderate warming would be of great assistance, as concrete develops a slight temperature rise after placing which will be maintained provided the material is protected from excessive cold. Straw can be used to considerable advantage in this connection.

There is one useful substance which is of considerable value in hastening the setting of concrete in providing a certain amount of warmth. This is a chemical compound known as calcium chloride, and is not unlike washing soda in appearance. It is comparatively cheap, and not more than 2 1-3 lb. are required for each bag of cement, also it does not injure either the concrete or the steel.

To use it, a stock solution consisting of 4 2-3 lb. to the gallon of water is made, and half a gallon of this is used as part of the mixing water for every bag of cement used. In very cold weather it may be warmed. It is also used in warm weather to hasten the setting of such articles as fence posts, the moulds of which may be required urgently for other work. However, once out of the moulds, the posts should be given the same treatment as regards retaining the moisture as pertains in cases where calcium chloride is not used as an accelerant. (Calcium chloride may not now be obtainable due to war conditions.)

Vibrating

Vibrating the mould in which concrete is being placed is a new development in the science of manufacture. The idea is that vibration at a fairly high frequency results in a much more even packing of the material. It also enables a mix of stiffer consistency to be used.

The method involved is that of coupling the mould—for example, a gang post mould—to a vibrating medium, such as a stationary oil engine, or to an eccentric of small throw attached to a shaft revolving at high speed.

While this system is highly desirable, it may not always be practicable on a small scale where only a few fence posts are being prepared. However, on farms where there is some live machinery, such as a tractor, there are means by which the vibration of such a machine may be directed towards the reciprocation of the mould, which must be mounted in such a way as to allow free movement.

Several examples of concrete work as applied to the farm are now given. While most farmers have their own ideas of going about the work, the details set out are the result of the experience of men who have specialised in concrete construction. Hence, they arrived at the most economical means of doing the work.

Concrete Paths

Concrete paths are about the simplest of all concrete works, and are usually the first concreting job to be done by amateurs.

There are no special tools required in this work—a good eye is the main thing. Cord lines are used to indicate the direction and to maintain the correct width of the path. Turf and soil are dug out between the lines until a firm foundation is reached. This should be even in depth for its full length, and any necessary levelling should be accomplished by the judicious use of sand or fine gravel, which should be rammed tight.

Side forms constructed from battens and nailed to pegs driven into the side of the track are necessary to confine

the material. At this stage shrinkage definers are introduced at approximately 6 ft. intervals to localise the shrinkage cracks which appear when the concrete has matured. These usually consist of 2½ in. by 3-8 in. laths secured transversely to the side forms at a depth of ½ in. below their surface. The concreting is carried right over them.

The concrete mix used should be stiff enough to be beaten flush of the side forms with a timber straight edge of 4 in. by 3 in. This beating should be sufficient to knock down any protruding stones and to work up a fine surface.

When the water glaze is disappearing from the surface the straight edge is again applied to give a rough finish, after which the edges should be bevelled along the side forms. Later on, cover with wet bags, wet straw, or other suitable material and leave covered for about a week.

The mix for this work should consist of 4 cubic feet of sand measured wet and loose, 7¾ cubic feet of 1 in. graded gravel or crushed rock, 1 bag of cement, and 8 gallons of water. This will cover approximately 30 square feet.

The cost, exclusive of timber and labour, works out at about 3s a square yard for 3 in. concrete.

Concrete Floors

Concrete floors are constructed in the same way as paths. If small, they may be put down in one piece, but for larger areas, shrinkage definers at 6 ft. intervals (both ways) should be provided.

In cow yards or stables the concrete should be given a slope of ¼ in. to the foot to facilitate drainage. The most desirable way in which to lay large areas of concrete, as in floors, is to do so in strips 6 ft. wide defined laterally by side forms and transversely by shrinkage definers. The scheme is to fill in alternate strips between the side forms and then to fill in the remaining areas when the first portion has set sufficiently to allow tramping. The side forms are, of course, removed before the work is started.

The following table gives an indication of the strength of the concrete required for typical paths and floors:

Class of Work.	Thickness in inches.	Quality of Concrete.	Size of gravel in inches.
Light footpaths, dairy and light shed floors	3-4	Ordinary good concrete (see table)	1 or less
Cow yards heavy shed floors, garage floors	4-6	Ordinary good concrete	1½ or less
Floors, drives, etc., for heavy duty	4-6	Extra strong concrete	1½ or less

An estimate of the area covered by a cubic yard of concrete when the proposed thickness is known is given below:

Thickness of concrete in inches ..	2	3	4	6	8	9	12
Area covered in sq. feet	162	108	81	54	40½	36	27

A final point in laying paths and floors—always finish off the section on which work is being done—that is, fill up to the nearest shrinkage definer if it is impossible to finish the whole job at one time. New concrete does not bond well with older mixes. If there is any prepared concrete left over, use it for foundations or for filling in a depression rather than doing part of a new section which will not be finished till next day.

Fencing Posts

Concrete posts are rapidly gaining in popularity for obvious reasons. They are durable, neat in appearance, and relatively cheap. Their resistance to fire is a very useful characteristic.

There are numerous shapes and sizes of concrete posts, but for general duty intermediate posts, dimensions of 6 ft. x 4 in. x 4 in., are eminently suitable, but no matter what particular style of post is chosen **adequate reinforcing is essential. It is not merely a matter of bundling into the mould**

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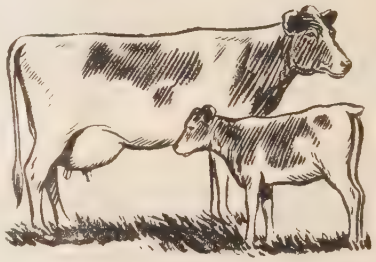

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several pieces of old iron and imagining that this is all that is required. Reinforcing rods near the centre of the post are quite useless. Actually, the nearer the exterior of the post the better, provided the rods are not exposed and thus allowed to rust. In general practice, a depth of ½ in. from the outside of the post is the most suitable.

It is generally desirable to prepare intermediate posts in a gang mould—one capable of turning out six or more posts at a time. Apart from saving time, it enables the most efficient use to be made of one mix of concrete. For example, a one-bag mix will make six 6 ft. x 4 in. x 4 in. posts.

The construction of a suitable mould should present no great difficulty, but for the sake of efficiency it should be made as durable as possible. Only well-seasoned, dressed Oregon should be used, and the minimum thickness of the timber should be 1 in.

Good Baseboard Essential

A good solid baseboard is essential, and on this are constructed the necessary cleats and blocks which support the mould sides. Care must be taken to prevent the side members from bulging when the concrete is being introduced, and to do this blocks should be fitted on extreme outsides of each of the outer members, while the inner boards are held in place by a transverse slotted board, which fits over them.

In placing the concrete, fill one mould at a time. First spread about ½ in. of concrete evenly over the bottom and place 2 reinforcing rods (which should be 2 in. shorter than the post) ¾ in. from the inside edges of the mould, pushing them into the concrete to a depth of ¼ in; for 4 in. x 4 in. posts, ¼ in. steel rods are used. Fill up until ¼ in. from the top of the mould, and place the other 2 rods, sinking them to a depth of ¼ in., ½ in. from the edges. Complete the filling, allowing some extra (1-8 in.) on top to account for the shrinkage. After half an hour beat the surface of the concrete with a piece of wood having an edge of one inch. The material will then resemble a jelly, and it will be noticed that the surplus water and scum has oozed to the surface. This should be scraped off to the level of the mould sides. As soon as possible cover with damp bags and leave until it is decided to remove the posts from the moulds—a matter of two or three days, depending on whether the conditions are warm or cool. The posts thus removed should still be covered with damp bags for four or five days more.

It should be noted that it makes no difference to the initial set whether normal or rapid-hardening cement is used. It is in the final stages that rapid-hardening cement indicates its usefulness. Using this, cement posts may be put into commission after 10 to 15 days old, depending on the weather. Ordinary cement requires 28 to 38 days. To reduce the time required in the moulds, calcium chloride may be used as an accelerant.

After the posts have been removed from the moulds the mould should be well washed and, when dry, treated with a thin mineral oil, such as crankcase drainings. This treatment should also be applied before the moulds have actually been used.

Attaching Wires

Wires may be attached to the posts in a variety of ways.

(a) By running the wires through holes in the post.

(b) By means of half staples which can be bent over the wires when the latter are in position.

(c) By double staples, placed parellel with the wires (that is, one above and one below) with a length of wire running through the eyes of the staples and thus holding the fence wires in position.

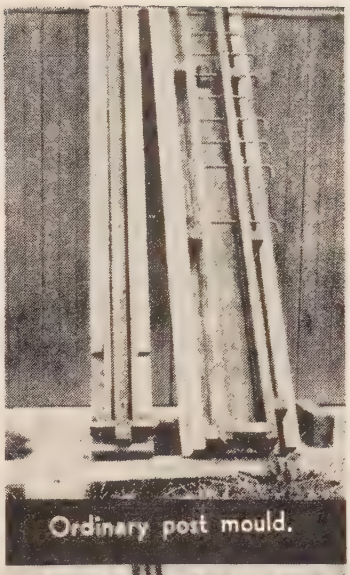
(d) By using an improvised staple, which consists of a length of No. 8 gauge wire which is bent so that one leg is about 2 in. long and the other about 5 in. This grips the wire and is driven through the post in 3-8 in. holes running at right angles to the line of the fence wires. The longer leg of the staple is then bent down at the back of the post, sometimes into a groove specially moulded into the post. This is fast becoming the most popular type of wire fastener for use with concrete posts.

Mixture for Posts

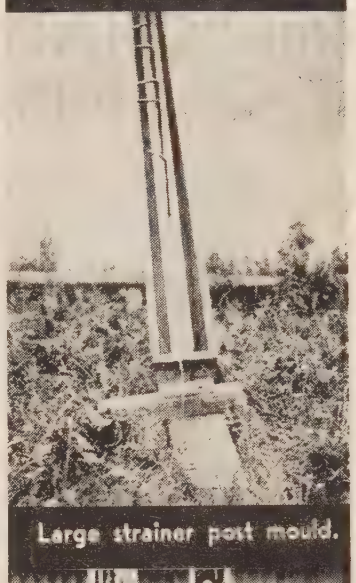
The concrete mixture required for ordinary fence posts consists of gravel having a maximum diameter of 3-8 in. A one-bag mix should be used, and the aggregate should be in the proportion of 3 cubic feet of 3-8 in. graded gravel measured loose to 2 cubic feet of loosely measured sand. If the sand and gravel are already mixed in suitable proportions, only 3¾ cubic feet of this aggregate need be used. If sand alone is used, take 5 cubic feet. The mixing water should not exceed 7 gallons for this mix.

For corner posts and straining posts, only single moulds will be required, as relatively few of these are needed in proportion to the number of intermediate posts. Corner posts need not have dimensions greater than 6 ft. 6 in. x 6 in. x 6 in., while straining posts for straight fence lines can be built to a size 6 ft. 6 in. x 6 in. x 4 in., and the moulds can be made accordingly.

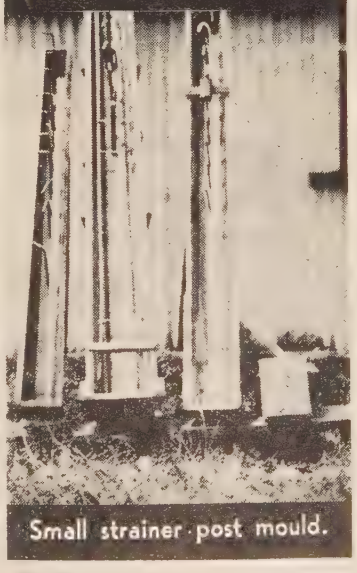
With the above types of posts, struts are generally necessary, and these may be made from concrete to a size of 7 ft. x 4 in. x 3 in. To receive the upper



Ordinary post mould.



Large strainer post mould.



Small strainer post mould.

end of the struts a slot should be moulded into the post by using a triangular block of wood at the bottom of the mould and in the required position. The lower end of the strut should be supported on a foot constructed from concrete 1 ft. x 6 in. x 3 in. thick. Reinforcing should consist of 4 5-8 in. steel rods in the case of corner posts, 7-16 in. for strainers, and ¼ in. for struts.

The following table is useful in making the above posts:—

Class of Post.	Dimensions.	Reinforcing. 4 rods per post.	Approximate weight of finished post.	Number of posts to each bag of cement.
Intermediate posts	6ft. x 4in. x 4in.	½ in. stel	95 lb.	6
Corner posts ..	6ft. 6in. x 6in. x 6in.	⅝ in. steel	245 lb.	2 2/3
Straining posts on straight ..	6ft. 6in. x 6in. x 4in.	7/16 in. steel	160 lb.	4
Struts	7ft. x 4in. x 3in.	½ in. steel	85 lb.	7

Water Troughs

Concrete as a material for water troughs cannot be excelled for the reason that it is most durable, absolutely waterproof if properly constructed, and requires no maintenance.

The troughs to be constructed on a farm will vary according to the type of stock carried and the purpose for which they are required. Horse troughs are usually of rectangular design and of robust construction, but perhaps the most useful type for general utility is one constructed in a circular form. The building of such a trough can be repeated any number of times, as the moulds are generally made from corrugated iron specially curved to suit the dimensions of the mould.

The following data covers the materials necessary for the construction of a trough capable of supplying 100 cows or 500 sheep, even with a slow feed pipe.

For the inner mould two 9 ft. sheets of currugated iron are required, and these should be rolled to give a clear inside diameter of 5 ft. 2 in., while for the outside, two 10 ft. sheets rolled to give a diameter of 5 ft. 10½ in. are necessary. These lengths will provide an overlap of sufficient length to allow for joining. The sheets should not be more than 21 in. high.

The components of the mould are bolted together with stove bolts at the overlap, allowing sufficient bolts to give the necessary rigidity. For convenience, wooden handles should also be fitted near the joints to allow easy removal of the moulds. These handles are merely pieces of wood 2 in. x 1 in. fixed vertically.

To construct the trough, lay the floor and allow it to set. Strips of tarred felt or old sacking are laid round the base of the walls and the mould set up. The inner mould is first placed and then wrapped round with heavy gauge wire netting, using a few vertical strips of wood 1¾ in. thick to space the netting away from the mould. As soon as the outside mould is set up the concrete can be poured in, the spacers being removed as the mould fills.

Careful tamping is essential to ensure a waterproof job. The moulds may be removed after three days with rapid hardening cement, and after seven days with ordinary cement.

A ball and chain valve should be used to control the water feed, the pipe of which is either set into the floor or taken up over the wall of the trough and down the bottom by means of suitable fittings.

The materials required are as follows:—

Cement, 5 bags.
Sand, 11 cubic feet.
Gravel, 20 cubic feet (1-8 in.-3-8 in.).

With each bag of cement, mix 14 gallons of sand and 25 gallons of gravel, using only 6 gallons of mixing water. However, most men have their own ideas about constructing a trough. The main points to be considered are suitable concrete mixtures and careful reinforcing.

Large Troughs

Large square troughs can be constructed for use in watering four paddocks simultaneously. Such troughs

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should have internal dimensions of at least 8 ft. x 8 ft., and should be 2 ft. deep.

The foundation should be carefully prepared, as the weight of the trough will be considerable. To ensure rigidity, it is desirable to reinforce the whole structure, floor and sides. This is best carried out by using prepared expanded metal or by means of 3-8 in. steel rods. Whatever method is adopted, the chief consideration is that of carrying the reinforcing from the floor right up the sides.

The floor is first filled in with high-grade concrete to a depth of 3 in. to 5 in., and the side forms (which have been constructed previously) erected. These forms should be well built from *Pinus radiata* or other suitable timber, and the sides well braced to prevent bulging while the concrete is being introduced. It is desirable to do all the concrete work at the one time, as it is difficult to bind new concrete with old.

In from 12 to 14 hours, depending on weather conditions, the forms may be removed and the sides of the trough rubbed with a wooden float to obtain a smooth surface. Plastering is unnecessary if a good concrete mix has been used. In any case, it is essential to prevent the concrete from drying out too quickly, and to this end the sides should be covered with wet bags and some water allowed to remain on the floor, or the forms could be left if not required.

During the construction of the floor the water inlet pipe should have been introduced somewhere near the centre, and, where, practicable, a 3 in. to 4 in. glazed earthenware bend should be provided to allow flushing. The inlet pipe, ¾ in. to 1 in. diameter, depending on the pressure of the water supply, should protrude about 6 in. from the floor of the trough and have an elbow screwed to it. The ball cock with ball removed is then connected by a suitable length of chain to the ball, which is then able to float on the surface of the water without fear of damage to the valve below. A rubber-lined wooden plug, suitably weighted and fitted with a handle, should be inserted over the drain bend, and this can be removed from time to time to clear away any sediment.

Pig Troughs

A suitable pig feeding trough is comparatively simple to construct and is useful for all feeds except skim-milk, the acids from which are liable to attack concrete. Suitable reinforcing is also required, as in the case of other troughs.

A useful trough for watering pigs has an inside measurement of 3 ft. x 2 ft. x 9 in. deep. The trough is divided into two sections by an inverted concrete box 2 ft. x 1 ft. x 9 in. deep which houses the ball cock and thus prevents any damage to it. The sides of this inverted box are slotted to allow a free flow of water. The concrete is sufficiently reinforced throughout, and is about 2 in. thick.

Concrete Drains

The use of concrete for gutters is well recognised, and concrete pipes for drainage purposes are very widely used, especially where pipes of larger diameter are required.

Concrete pipes for farm sewerage purposes can be prepared and laid in the following manner. A cylindrical form is prepared, the diameter of which is that of the inside of the pipe required. This form is constructed from heavy gauge sheet iron, and is split from one end to the other by a long tapering cut. When the form is in use this cut is filled by means of a long slide shaped to the same taper, so that when it is inserted the form has an even diameter throughout.

The trench is dug as for laying ordinary drain pipes, and about 2 in. of concrete placed on the bottom. With the slide inserted, the form is laid above the layer of concrete. More concrete is then poured on top of the form, adequate ramming going on during this time until there is a layer of about 2 in. of concrete right around the form. This is allowed to set for about two hours, after which the slide of the form is pulled out about 3 in. to allow the easier removal of the mould. After from six to twelve hours the slide is withdrawn completely so that the walls of the form collapse. A 2 in. layer of concrete is placed in the trench as before, and the form can now be pulled out until only about 3 in. of it remains inside the completed sec-

Pig-Meat Prices

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AN APPEAL is made to pig-producers to increase their production, particularly of bacon pigs, to the greatest possible extent during the present season.

A survey of the supply position reveals that the quantity of pig-meat available is substantially below that necessary to meet the needs of the local market and to fulfil present contracts for the Armed Forces in the Pacific.

To encourage greater interest in pig production the schedule of pig-meat prices has been increased, and will operate as follows:—

On May 1, 1944:

There will be an all-round increase of one halfpenny per lb. on porkers and baconers, which brings the schedule to:—

Prime porkers	60 - 120 lb.,	7d. per lb. "head on" weight.
Prime baconers	121 - 175 lb.,	7¼d. per lb. "head on" weight.
Prime baconers	176 - 185 lb.,	6½d. per lb. "head on" weight.
Prime baconers	186 - 200 lb.,	5½d. per lb. "head on" weight.

On June 1, 1944:

There will be a further increase of ½d. per lb. to cover the winter months, which will bring the schedule to:

Prime porkers	60 - 120 lb.,	7½d. per lb. "head on" weight.
Prime baconers	121 - 175 lb.,	7¾d. per lb. "head on" weight.
Prime baconers	176 - 185 lb.,	7d. per lb. "head on" weight.
Prime baconers	186 - 200 lb.,	6d. per lb. "head on" weight.

On July 1, 1944:

The schedule price for prime porkers, 60-120 lb., will go up to 7¾d., and this price will hold until September 1, 1944, when it will be reduced to 7½d.

On October 1, 1944:

The schedule will be:—

Prime porkers	60 - 120 lb.,	7d. per lb. "head on" weight.
Prime baconers	121 - 175 lb.,	7½d. per lb. "head on" weight.
Prime baconers	176 - 185 lb.,	6¾d. per lb. "head on" weight.
Prime baconers	186 - 200 lb.,	5¾d. per lb. "head on" weight.

On November 1, 1944:

From this date the schedule for all classes will be as follows:—

Prime porkers	60 - 120 lb.,	7d. per lb. "head on" weight.
Prime baconers	121 - 175 lb.,	7¼d. per lb. "head on" weight.
Prime baconers	176 - 185 lb.,	6½d. per lb. "head on" weight.
Prime baconers	186 - 200 lb.,	5½d. per lb. "head on" weight.

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tion. The slide is replaced and the concrete poured on until the next section is completed. Pipes of any diameter can thus be made, although the construction of the form may present some difficulty. About 24 feet a day can normally be laid, the form being about 8 ft. long.

No reinforcing is required unless there is to be heavy traffic over the drain, in which case the concrete must also be made thicker. The trench can be filled in immediately after the removal of the mould, and this has the advantage of preventing too rapid drying out of the concrete. Junctions and changes in direction are made by means of a concrete box into which the pipes run. These boxes are covered by a concrete lid, which can be removed to clean out the drain in case of blockage.

Concrete Buildings

Concrete buildings are constructed on two main principles, namely, concrete laid on the spot and concrete made into and used as "bricks." Of the two, the former is more often used in the construction of out-buildings, while the latter is used in the construction of dwellings, the reason being that the "bricks" are usually made with a hollow section and thus allow for ventilation and provide a double wall.

In the construction of walls of solid section, the general practice is to erect piers of considerable strength and then fill the 6 ft. intervals between them with a "curtain" wall. Depending on the height of the walls, the piers may be 6 in. x 6 in. or 8 in. x 8 in. in cross section. These are spaced at 6 ft. intervals, being inserted into the ground to a sufficient depth to ensure rigidity. The reinforcing of the rest of the wall is then bonded into them, a longitudinal slot running down each side for the full length of the wall to allow of bonding of the "curtain" walls. Rigid forms are then applied to give a normal wall thickness of 3 in. and the concrete poured in. The resulting wall is usualy flush on the inside of the piers, while the outside presents a series of projecting ridges.

If the concrete is well prepared, plastering of the finished walls is unnecessary, the concrete being well rubbed while in the "green" state.

Where concrete "beams" have to be constructed, as above doors and windows, great care must be taken in the preparation of the reinforcing. As stated in an earlier part of the article, pure concrete cannot withstand bending, although it can resist considerable compression. A beam supported at each end is subjected to two distinct stresses—tension on the lower side and compression on the upper. Thus, the reinforcing must be concentrated at the lower side of the beam where the tension occurs. Less reinforcing is needed on the upper side, where the stress is that of compression. For example, a 20 ft. concrete beam to carry a distributed load of 14 tons should be 15½ in. deep and 8 in. thick while the reinforcing should consist of two 3-8 in. steel rods at the top and four ½ in. rods at the bottom.

Suppose, however, that the beam is supported at intervals along its length on piles. Then, at each point of support the beam is bent in the opposite direction, that is, compression occurs on the lower side, while tension occurs on the upper. Hence, at this point, the reinforcing should be concentrated on the upper side of the beam.

If concrete columns are built, say, to support a floor, the reinforcing must be so arranged as to prevent lateral distortion of the column. An unreinforced concrete pillar supporting a heavy load would have a tendency to become barrel shaped. To overcome this tendency, wire stirrups are used to bind the reinforcing rods. For example, a column shorter than 8 ft. in height and 10 in. x 10 in. in thickness reinforced by four ¼ in. rods would have stirrups of No. 8 gauge wire 8 in. apart along the length of the column. Such a column would support a load of 14 tons.

Acknowledgment

The author wishes to acknowledge the assistance given by Mr. J. R. Marks, A.M.Inst.C.E., M.N.Z.I.E., of Wilsons (N.Z.) Portland Cement, Ltd., Auckland, in compiling this article.

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Veterinary Notes for the Farmer

Common Misconceptions of Animal Diseases

IN THEIR contact with farmers veterinarians sometimes meet with beliefs or notions which, when examined in the light of facts definitely established by science, prove to be erroneous. Here are some of them:—

1. **That hydatid cysts are commonly found in rabbits.** The reason for this common misbelief is that although cysts are often found in rabbits they are not the same as the hydatid cysts found in other animals, such as sheep, cattle, or pigs. The cysts found in rabbits and hares may be the intermediate stage of either of two large tapeworms (several feet in length) which occur in dogs. (a) *Cysticercus pisiformis* is the intermediate stage of *Taenia pisiformis* in the dog. These cysts are found in the abdominal cavity of the rabbit. Each contains a tapeworm head which develops into a tapeworm when eaten by a dog. (b) *Multiceps serialis* is the intermediate stage of the tapeworm *Taenia serialis* in the dog. These cysts are found in the intermuscular tissue of rabbits. Each cyst contains many tapeworm heads which develop into tapeworms when eaten by a dog. Hydatid cysts are never found in rabbits and are the intermediate stage of a quite different tapeworm (*Echinococus granulosis*) also found in the dog. This important tapeworm is only about a quarter of an inch in length. Rabbits, therefore, play no part in the spread of hydatid disease in man and animals.

Tuberculosis

2. **That if a cow has tuberculosis her calf is likely to have it.** This is not the case, as heredity plays a very small part in the transmission of tuberculosis. It is only very rarely that a calf is born with tuberculosis. The disease is definitely uncommon in calves up to one year and the incidence increases with age. A calf reared on a tuberculous cow may, however, contract the disease from the milk, but tuberculosis is essentially an acquired disease, not a hereditary one.

3. **That kidney disease is common in horses.** This statement has no more truth in it than the common belief that backache is usually a sign of kidney trouble in human beings. On being called to a case of colic veterinarians are often told that the horse is "having trouble with his water." This is probably because a horse suffering from colic often makes frequent attempts to pass urine. The term colic means "pain in the abdomen" and is nearly always a sign of trouble in the intestines and not in the kidneys or bladder. Colic is the cause of nearly half the general death-rate in horses. The cause is usually neglect of the proper methods of feeding and watering. Horses, like other animals, respond to good treatment, and many cases of colic could be avoided by attention to the quality of the feed and avoidance of irregularities of feeding and watering.

Strong Antiseptics

4. **That the stronger an antiseptic is the more effective it is.** Much harm is often done in the treatment of wounds or injuries in animals by the application of strong or unsuitable antiseptics. The animal body has a very effective defence against infection and modern antiseptic treatment aims at assisting this natural defence as far as possible. Strong disinfectants may kill bacteria, but they also irritate the tissues, kill the cells that would normally deal with the invading bacteria and so retard healing. Many modern antiseptics do not kill the bacteria, but by preventing their multiplication enable the natural defence mechanism of the body to overcome them. It is wise, therefore, never to use antiseptics above the strength recommended by the manufacturers, and never to use irritant or unsuitable applications.

5. **That if a cow is feeding on ergot-affected pastures the milk is dangerous to human health.** Although this idea has been widely circulated there is no truth in it. The toxic substances found in ergot are not excreted in the milk, even when animals are suffering badly from ergot poisoning. It should therefore be quite clear that the idea that the milk is likely to have widespread effects on the health of those drinking it has not been proved.

Assisting Nature

6. **That the recovery of an animal can always be attributed to the effects of the medicine administered.** Veterinarians are sometimes amazed at the faith farmers place in drugs, which are often administered indiscriminately, regardless of the requirements of indi-

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till the lambs are in the yard before sending that faulty Earmark to us. They CAN be reconditioned, and we can do it. Let's have yours now.

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vidual cases. They are also amazed at the amount of money farmers are prepared to spend on drugs. If the animal recovers the last particular medicine administered is invariably credited with a cure. This is not a very scientific attitude to adopt, and results from failure to recognise that natural powers of recovery exist to a greater or less extent in the majority of disease conditions. It is obvious that there must first of all be an accurate diagnosis of the complaint before rational treatment can be provided. All medicine should as far as possible, and in the absence of expert veterinary opinion, be given with a view to assisting nature to overcome the disease.

7. **That tuberculosis of the lungs in human beings is commonly contracted from cows.** Although the bovine type of tubercle bacillus is an important cause of some tuberculosis in human beings, tuberculosis of the lungs is not one of them. This erroneous belief is not uncommon, and the cow is often wrongly blamed for the spread of all forms of human tuberculosis. As a matter of fact less than one half per cent. of tuberculosis of the lungs in human beings results from the bovine type of infection. The form of the disease for which infected cows can often rightly be blamed is tuberculosis other than that of the lungs in children up to 16 years of age. This refers particularly to tuberculosis in the glands of the neck and to a less extent of the bones and joints and of the abdominal cavity. Children are much more susceptible than adults and it is a wise procedure where cows are not tested for tuberculosis to make the milk safe by boiling or suitably pasteurising.

—A. G. BRASH, B.V.Sc.,
Veterinarian, Christchurch.

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Trees for Farm Shelter

Now is the time for the commencement of tree planting, which may be continued, except in the coldest districts, throughout the winter months, for by now the land has been well moistened by the autumn rains and no check owing to lack of soil moisture will occur. The first year after planting is the most dangerous for the young tree, for not only may it succumb to drought in the summer of that year but it is very liable to destruction by rabbits. Where rabbits are plentiful steps to destroy them should be taken prior to the planting of the trees, because their presence in large numbers may easily result in loss of a large proportion of the trees.

IN PLANTING make as much use as possible of ground of least use for agricultural purposes. Frequently it is found that planting in waste gullies and steep places is the easiest method of avoiding ground draught, a common fault in shelter belts.

Plantations should necessarily be placed to obstruct the prevailing wind and at the same time avoid too much shading of the ground. Where suitably placed gullies or hillsides are not available the fences protecting the trees from stock should be placed well away from the trees, so that when they are mature stock cannot nibble or rub against the lower branches, causing their defoliation and resulting in ground draught. The fences need to be substantial to effect permanent protection. Some trees do not require as much protection as others whose foliage is liked by stock. To protect the former the fence must be strong and at such a distance from the trees that stock are not tempted to strain against the fence in an attempt to reach the trees.

The Young Trees

Young trees are usually planted in spits which have been dug some time beforehand, so that the soil is in a fit condition. So that the young trees may establish quickly incorporate a few ounces of blood and bone in the soil prior to planting. Young trees will respond to occasional dressings of fertiliser after planting and if animal manure is available some of this will accelerate growth. Make the soil firm around the roots and plant the tree at its natural depth with the roots spread and not bunched together. The space immediately surrounding the

Lawsoniana make good low shelter on suitable soils.

Trees planted in gullies or on hillsides prevent ground draught.

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Pines and *Lawsoniana* make a good combination if adequate room is given for development of the trees.

trees should be cleared of vegetation and thereafter kept clear until they are able to cope with the competition of the surrounding growth. The remainder of the vegetation should be left undisturbed because it will afford shelter.

The distance apart of planting varies according to the kind of tree. Unless trees are required subsequently to provide timber and unless a properly closed windbreak is required at an earlier date, there is no need to plant closer than will provide room for the tree when it is about 10 years old.

It is better to plant at least two varieties for the main belts, one to provide tall shelter and the other more suited to provide ground shelter and the hardier one of the two should be placed on the windward side. For interior shelter one row of trees for low shelter is all that is necessary, provided that sufficient room is given to protect the lower branches from stock. In fact, better shelter from winds is provided in this manner than by two or even more rows, where the outside branches are not given sufficient room to grow undisturbed, for it is on the lower outside branches that you must rely to prevent most of the ground draught.

Species to Plant

The farmer should be guided by reliable local nurserymen and local experience as to species to plant; and advice is also available from Fields Division officers and from the Forestry Department. Gaps in plantations through death of mature trees are usually caused by the planting of varieties that do not entirely suit the soil and climatic conditions. Farmers intending to plant for shelter should read the article "Farm Shelter" prepared by Mr. P. S. Syme appearing in this journal in February this year and other articles that have appeared from time to time.

In spite of adequate protection from stock some species of trees, such as *Pinus radiata*, do not give good low protection from winds when they reach maturity. They can be induced to maintain their lower branches for a longer period than usual by topping when about 15 years old. In time, however, the growth form of this kind of tree, despite topping, results in much ground draught, and unless other trees providing low protection from winds have been planted alongside, they may have to be cut down and replaced by trees which will provide a more suitable shelter belt.

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Feeding Root Crops to Sheep

LARGE fields of root crops should always be fed off in breaks not only to prevent waste but also to give each class of sheep as continuous a supply as possible of the most suitable type of food.

The type of food fed is dependent on the mouth of the sheep and also whether it requires a maintenance diet, a fattening diet or one which will give rise to growth of the animal. The leaves of the turnip are soft and do not require a well-filled mouth of sound teeth; they contain more protein and minerals than the bulb and are therefore better for promoting health and growth in young animals. The bulb is most satisfactory for fattening and maintenance.

There are two times in the life of the sheep when the teeth are inadequate to deal with hard food—in old age when the teeth are decayed and as a hogget when it is losing its baby teeth and the two central permanent incisors are not fully in position.

In feeding off breaks, therefore, the hoggets should be fed the tops of the turnips, mainly because this type of feed is more suitable for health and growth of young animals and partly because of the difficulty hoggets have in eating the bulb. Old ewes whose teeth cannot cope with the bulbs must also be fed the tops, although this type of animal should if possible have been disposed of before winter. Next come wethers and ewes requiring fattening. These should not be allowed to taste the tops, otherwise, particularly when arriving at prime condition, they may refuse to consume sufficient of the bulb to maintain the required rate of increase in weight. Lastly the shells are reserved for feeding to the sound-mouthed breeding ewes followed by any sound-mouthed, non-breeding mature sheep which are to be only maintained in condition.

Tops eaten by hoggets, the bulbs are now ready for consumption by the sound-mouthed adult sheep.

Sometimes sheep if unaccustomed to turnips will not commence feeding on the bulbs unless they are first put on the tops and an exception may have to be temporarily made in regard to the method of feeding outlined above.

In feeding turnips always provide a grass run-off and arrange so that the sheep become gradually accustomed to their new diet. In frosty weather the sheep should be removed to pasture in the evenings and not permitted on the turnips in the mornings until the frost thaws. Hay, straw or oat-sheaf chaff should be provided to balance the diet when feeding turnips.

Large areas of swedes should be fed in breaks.

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Growing of Wheat

IT IS time for the sowing of winter wheat. The ground should be in good order for the drill: that is, firm and fine below with any small lumps brought to the surface. Large clods will have been brought to the surface by the cultivator, and reduced by rolling and harrowing.

An indication of the variety to sow can be obtained from the Wheat Research Report on Wheat Varieties, a summary of which has been prepared by Mr. J. H. Claridge and appeared in the February issue of this journal. More precise information in regard to the sowing of a particular field can be obtained from the local Fields Division officer, who can also advise concerning the growing of the crop. The seed should be plump and free from weed seeds and foreign matter and pure as regards variety. The amount of seed to be sown varies with the time of sowing, the soil, climate and variety. On light land with small seed 1¼ bushels may suffice, whilst on heavy land using varieties with large grain for seed two bushels may be required. Larger amounts still are required for spring sowings, especially in the high-rainfall areas, where up to 2½ bushels are commonly sown. Before sowing the seed should be dusted with organic mercuric materials to prevent rust. After drilling the ground should be harrowed to cover the seed. To obtain a good yield it is necessary that there should be a fairly thick and even strike of plants. This cannot be obtained by very heavy sowing but is dependent on a properly prepared seed-bed free of rubbish and large clods and an even-sowing drill.

Effect of Super

A considerable amount of experimental evidence covering about 20 years is now available on the effect of fertilisers on the production of wheat in North Otago and Canterbury. In the early years wheat gave fairly consistent and payable increases in yield for an application of 1 cwt. of super per acre with the seed. Latterly experiments show much less benefit from the application of super to wheat. This may be due to the improvement of the pasture lands of Canterbury through sowing of better strains of grass and clover seeds and the topdressing and better management of them.

However, in view of the fact that the residual effect of fertiliser applications has not been measured, it would be advisable under present circumstances for all wheat growers to use as much phosphate as the present ration provides.

To make sure that the civilian population and Armed Forces in the Dominion obtain sufficient bread and to replenish the stores of ships visiting New Zealand ports it is necessary that farmers in the Dominion grow approximately 300,000 acres of wheat annually. So far this figure has not been reached, although the production of the immediate pre-war years has been improved on to a very great extent.

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Virgin Heavy Soils

BY May the ground is sufficiently softened by autumn rains to enable ploughing or other means of deep cultivation of heavy soils to be performed with ease and yet not so wet that tractors and horses have difficulty in travelling over the ground. Before cultivation commences all tall scrub should have been cut and the area burnt so that cultivation is interfered with to the minimum extent. Leave the ground in a rough condition throughout the winter so that the maximum of the soil is exposed to air and sunshine. If the soil is made too fine, and particularly is this so concerning the extremely heavy soils, it will become packed down and waterlogged with the heavy winter rains. Hence the plough would appear to be the best implement to use. The cultivated area should be left undisturbed until the spring when it becomes dry enough for further cultivation to take place.

—*J. E. BELL, Acting Land Utilisation Officer, Wellington.*

In the Orchard and Vineyard

Orchard Notes

Pruning Stone Fruits

THE pruning of stone fruits may be started as soon as the leaves commence to drop, at which period the growth should then be fully ripened.

In practice there are so many deviations from well-defined systems rendered necessary by varietal peculiarities, physical condition of the tree, age, etc., that any definite directions are apt to be misleading, but broadly the general principles apply throughout, and by noting the fruiting habit of the tree and its response to previous prunings any modification necessary can be made on well-defined lines. Briefly, the objects of pruning are:—

(1) To build up and maintain a physically strong tree of a size and shape best suited for convenience and economy in management.

(2) To maintain the balance between wood and fruit production, and ensure an annual average production of fruit of good size and quality.

(3) To regulate or modify the growth, in order to obtain an even distribution of the fruiting wood throughout the tree.

Peaches and Nectarines

Peaches and nectarines crop on the previous season's growth, both on laterals and short spurs; the latter are really very short laterals and are more prevalent on the nectarine than on the peach, though some varieties of peach develop them freely. The important point, however, is that both laterals and spurs are good only for one season; consequently the peach must be encouraged to make ample new growth if it is to carry good crops.

To obtain this renewal of fruiting wood the peach tree must, in the first place, be kept in good vigour, but much can be done by pruning to encourage the renewals in the most convenient places. In some cases the two-year-old laterals will have thrown out side laterals carrying fruit buds and they can be treated by one or two methods:—

(a) The two-year-old lateral may be shortened back, leaving one or more of these secondary laterals according to the amount of fruiting wood it is desired to leave on the tree, trusting to the more or less severe shortening of the two-year-old lateral causing fresh growths to form during the following season to supply fruiting wood two years hence.

(b) The two-year-old lateral is shortened less, leaving a greater number of secondary laterals, some of which are shortened to buds near their base to provide fruiting wood for two years hence and others being left to carry the coming season's crop. This method is found especially useful in cases where the best fruiting secondary laterals are near the outer extremity of the two-year-old lateral and those near the base are carrying very few fruit buds. These latter near the base of the old lateral can be stubbed back to encourage fruiting wood, whereas the better fruiting lateral nearer the outer extremity of the old lateral can be preserved to provide the coming season's crop.

Subsequent Fruiting Wood

In some varieties many of the two-year-old laterals will develop many short side growths crowned with a cluster of fruit spurs. These should be shortened, leaving sufficient spurs to carry the coming season's crop; the shortening will generally have the effect of developing fresh laterals that can be used two years hence.

If the two-year-old lateral throws neither secondary growth nor fruit spurs, but only dormant buds, it should be cut hard back, leaving two or three sound, dormant buds closest to the base, in order to provide subsequent fruiting wood. If, as sometimes occurs, the two-year-old lateral develops neither secondary laterals, spurs, nor dormant eyes, it should be removed altogether, care being taken not to injure the ring at its base where it junctions with the main limb. The removal of the lateral in this way removes an outlet for sap which encourages the wakening into growth of dormant eyes in the vicinity, sometimes right at the base of old laterals. In vigorous trees, especially in that part of the main limbs closest to the current year's leaders, a greater number of primary yearling laterals will

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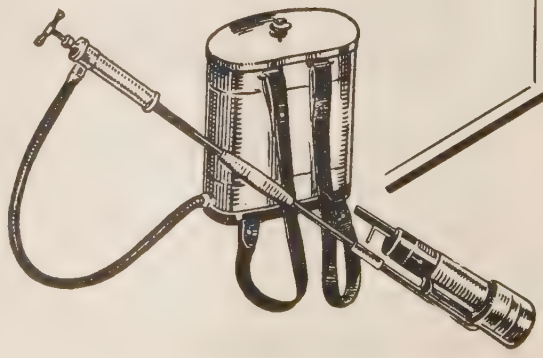

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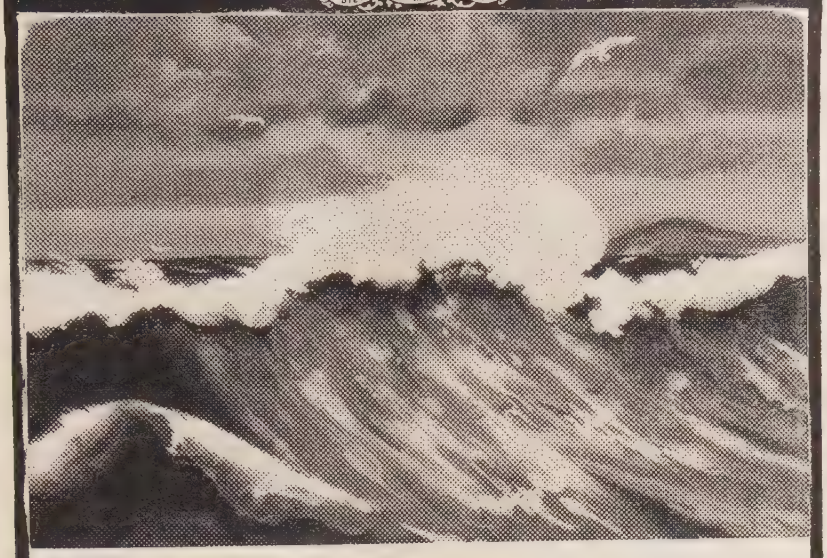

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Goitre is an enlargement of the thyroid gland in the neck. It may remain only slight, or it may become an unsightly bulge, or develop into the 'staring eye' type which requires an operation.

Goitre often occurs in the unborn child, in the adolescent, and in the expectant mother. *But it is all preventable.*

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All over the world, wherever Iodised Salt has been continually used by the whole population, *Goitre has declined.*

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Iodised Salt should be your only salt—for cooking and table use.

Expectant mothers! Prevention of Goitre should begin before birth. Are you getting plenty of iodine foods?

19

FOR A HEALTHIER NATION

be found than is required for the following season's crop.

These should be thinned out by stubbing them back to a couple of sound buds nearest to their base; this will often result in the formation of two weaker lateral growths. At the following season's pruning one of these should be left to provide the coming season's crop and the other stubbed back to provide new wood. The length of the yearling laterals that are left should be reduced if the tree is generally a heavy setter and if it carries buds well towards the base of the laterals, but with trees that usually set only a light crop, or those that carry fruit buds only at the tip of the laterals, they should be left longer or not shortened at all.

Plums

European plums crop mostly on spurs, either direct on the main limbs or on the two-year or older laterals. With many varieties it is preferable to leave the yearling laterals full length to encourage the development of fruit spurs. With others, however, it is better to shorten the yearling laterals slightly. Here again, the spurs on some varieties are only short lived, and it is necessary to shorten back the two-year-old laterals to help maintain the spurs and effect renewals.

The Japanese plum crops mostly on the previous season's growth and on spurs. It is, generally, an easy tree to manage, as not only do the spurs crop for several years, but they are also easy to renew as they become spent.

Although the Japanese varieties will generally spur, even if the yearling laterals are cut short, it is preferable, if the trees are making strong growth, to shorten only slightly as more spurs will then be formed and there will be less shoots to thin out at the following pruning. The two-year-old laterals may be shortened, or the yearly extension only removed to assist in maintaining the spurs and provide for renewals. Any laterals that have run bare of spurs should be removed as described in connection with the removal of spent peach laterals.

Apricots

The apricot bears fruit on the previous year's growth, and many varieties also carry their crops on spurs which last or naturally renew themselves for more than one year. Some varieties under certain conditions, indeed, develop very few spurs, their cropping being chiefly on the previous year's laterals; in such cases the management is similar to that of the peach. With the spur-bearing class it is generally necessary to shorten the two-year-old or older laterals to develop the spurs they carry near the base and to encourage renewals.

—A. T. DOUGLAS, Acting District Supervisor, Horticulture Division.

Harvesting and Grading

WHERE infestations of the main citrus varieties with white wax scale have appeared the numbers of scales present may vary from scattered individuals to serious infestations in cases where their populations have been built up over several seasons without successful control measures being taken against them.

Spraying

If a control spray was not applied in the latter part of April, a thorough application even now will do much to reduce the carry-over into next season.

An autumn Bordeaux spray, 3:4:50, should be applied towards the end of May or in early June. This spray should cover all parts of the trees to obtain the best results, the main object of its application being to control brown rot. Accordingly, in the event of circumstances limiting the time which can be devoted to this spray, the trees should receive a careful covering at least up to four or five ft. from the ground. The fruit and foliage of the lower parts of the trees are the most likely to be attacked by citrus brown rot.

SEASONAL WORK

Spray with Bordeaux 3:4:50 during May or early June, mainly for control of brown rot of citrus.

Keep lemon harvesting up to date.

Overhaul packing shed equipment to be used for handling orange and grapefruit crops.

Lemon Harvesting

The coming month should show a definite upward trend in the quantities of lemons ready for harvesting. With the peak of the season approaching it will be well to keep early winter picking as close as possible, without taking immature lemons, in order to distribute harvesting as evenly as can be managed over the busy period. Well-planned picking can help labour problems in the orchard, while assisting handling and marketing as well.

Packing Shed Equipment

Simple equipment, designed to speed up packing shed work without undue outlay for machinery, will assist growers with relatively small crops to handle and limited shed space within which to work.

Many orange and grapefruit crops have increased in recent years from a few cases to moderately large quantities which, without provision of some kind of equipment, must prove increasingly difficult to handle. Nevertheless, while crops may have reached a volume not easy to cope with, in the absence of any shed conveniences, they do not necessarily justify installation of sizing machinery designed to handle large crops. To deal with these intermediate quantities of fruit it is suggested that the "long bin" system, or a modification of that system adapted to the space available, could be used with advantage and at little expense.

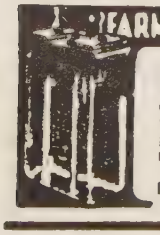
"Long Bin" System

The "long bin" system dispenses with preliminary sizing of fruit before it reaches the packer. It depends on packers developing the aptitude of sight-sizing oranges, and selecting those required for each case from the full range of sizes displayed in a shallow bin. While this may seem difficult to those who have not made the attempt, skill in sight-sizing is quite easily acquired; in fact many graders now in the habit of sizing fruit preparatory to packing have already developed the art of sight-sizing to save time. Many growers have some device constructed to act as a sizing guide, but in practice most people find that hand-sizing may be carried out satisfactorily with only occasional reference to the checking guide. The object of the "long bin" system is to reduce handling time, by simplifying grading, without appreciably slowing the packing.

A long table or bin, with a top of sacking, is required. It should be 30 in. to 36 in. wide and about 33 in. high for easy working. The length should be not less than 5 or 6 ft. and may be considerably more to accommodate several packers. The sacking should be stretched fairly tightly so that there will be very little sagging when it is loaded with fruit. This will ensure that only a shallow pile of fruit will be on the bin at any time, which will make selection of sizes easy and will reduce injury to fruit which would be caused by searching through a deeper layer for suitable sizes.

First for Quality

The fruit is graded first for quality, one grade being put directly on to



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the bin, if convenient, and the other into boxes which will be held until the first grade is packed. The packer then commences by selecting fruit of the predominant size for his first case. He starts at one end of the bin and moves his case along as he uses up the size on which he may be working. Some prefer a packing bench running the full length of the bin, the packer standing at the side of the case, leaning over it to reach the oranges, and having the advantage that the fruit is in view directly in front of him. He moves the case along the bench as required. If it is desired to pack from the end of the case, standing side-on to the bin, a movable stand with small casters or wheels on the front legs to facilitate its movement will stand firmly while packing is done.

When the first case has been filled the packer selects the next most numerous size for his second case, and so on. There may not always be sufficient of the largest or smallest sizes to complete a case from the fruit on the bin. It is best to pack part cases of these, to be set aside until more of the same size accumulate, rather than leave odd sizes in the bin too long. However, with a bin 8 ft. or more in length it is rarely necessary to put aside a partly-filled case. With a little practice packers readily develop the art of selecting fruits of the sizes required for the various packs, soon learning to take advantage of the slight permissible variations of size within a case to bring the finished pack to the desired level.

Sight-sizing Necessary

In actual operation sight-sizing is necessary with most home-made contrivances, even to the smaller mechanical sizers. Few of the machines in use are capable of sizing flattish fruits, such as New Zealand grapefruit, by any means accurately; consequently two or more counts are usually packed from each bin. The "long bin" system demands merely a fuller development of the art of sight-sizing, and facilitates this by displaying the fruit on a shallow bin, and causes less mechanical injury to the fruit.

Quality grading, without the complication of hand-sizing at the same time, becomes simpler and quicker. With a few days of experience a packer will find his speed little, if any, slower from the "long bin" than from the bins of a mechanical sizer delivering poorly-sized fruit.

The "long bin" system is not new, but has been used by packers of large, as well as small, quantities of various kinds of fruits for many years, being especially suitable for handling stone fruits and tomatoes. It is recommended for trial by orange or grapefruit growers who may be experiencing difficulty in handling crops with existing equipment, or who have not yet provided for the packing of their crops.

—I. L. NOTTAGE, Orchard Instructor, Auckland.

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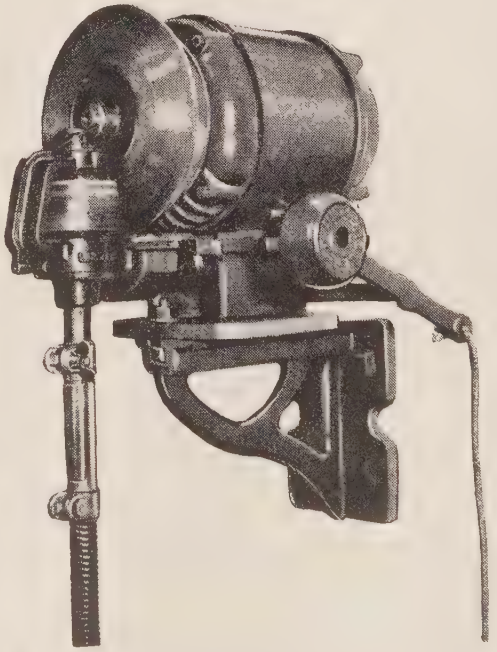

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Guide for the Home Garden

Looking Ahead

IN MOST districts where vegetables are produced, June is the month when "anticipations forward point the view," and in this respect it is well to look around for work it may be convenient to do while the condition of the soil will not permit the use of digging tools. Following are some matters which may be attended to:—

Soil Sterilisation

The strict meaning of this term is partial soil sterilisation, because no soil after being treated is completely sterile. In the June, 1943, issue of the Journal of Agriculture a cheap, practical, and efficient method of sterilising small quantities of soil was described and illustrated. This may be reviewed and advantage taken of opportunities as they occur to prepare the necessary quantity of soil which it is estimated may be required for next season's seed-sowing and plant-growing operations.

Many gardens visited during the past season showed unmistakable evidence of neglect of this very desirable practice. To sterilise the necessary quantity of soil in which may be grown sufficient plants for one's own garden requirements is not difficult or expensive, if the methods are adopted as set out in the Journal referred to above.

Plants grown in treated soil, provided the operation is carried out properly, will always have a better chance of reaching maturity through vigorous, healthy development than those propagated in the ordinary untreated garden soil.

Cleaning Up the Garden

This is a matter which calls for exacting attention at any time, but particularly in what, by some gardeners, is termed the "off season." Quite properly, in gardening, however, this term does not apply. Live hedges should be trimmed back and the tender cuttings placed in the compost heap or dug into the garden, a practice which, unfortunately, is too often entirely neglected. To destroy these tender green hedge trimmings by burning and then to allow the ashes to remain on the site of the fire until the valuable plant-ash content is washed into a small part of the garden soil is poor gardening practice.

Recently an officer of the Horticulture Division of the Department of Agriculture had the following conversation with a home gardener who was cutting his hedge and throwing the trimmings on an adjoining roadway. Officer: "Trimming things up a bit?" Gardener: "Yes, I never allow the hedge to get out of hand." Officer: "Why are you throwing the cuttings on to the roadway, and why don't you either put them on your compost heap or dig them into the garden?" Gardener: "Well, my neighbour told me they were no good for either purpose." And this was a hedge of *Escallonia pendula*, the tender trimmings of which would, if utilised in either of the ways suggested, have decomposed in a very short time.

Perhaps the following suggestion may not be out of place. Hedge cuttings when young, if not utilised as suggested for enriching the garden soil, should be distributed close into the bottom of the hedge and as near as possible to the rooting system of the plants. This ultimately forms a valuable composted manure which is utilised by the hedge. In this way all the plant food taken from the soil is returned after decomposition.

Garden weeds should not be permitted to grow and, particularly, never allowed to seed. A garden, or any part of it where vegetables are not growing and on which weeds are flourishing, soon becomes a breeding ground for pests which are more or less certain to attack and probably destroy crops which may be planted later. In addition, many weeds are convenient hosts which provide food for insect pests during a period when vegetable crops are not available. The necessity, then, for keeping the garden free of weeds is very important.

Don'ts

Don't overlook applications of liquid manure to spring cabbage plants or a "pinch" of nitrate of soda every 10 to 14 days.

Don't waste seed by using large quantities at each sowing. A little seed will go a long way in the production of plants for the home garden.

Don't be late in preparing for early potato planting, but remember the danger of late frosts.

Don't discard soot indiscriminately. It is a valuable manure as well as a slugicide, and when used judiciously is specially valuable for assisting to raise the soil temperature in early spring. It should be stored where it will not be exposed to rain.

Garden Paths

Parts of the garden area which may have been used as paths between beds of plants should be dug, thrown up roughly, thereby having the maximum surface exposed to "weathering." This will result in its being more easily workable in the spring.

In addition to the above old seedling boxes may be repaired and new ones made. It should, however, be remembered that timber is scarce and that no new boxes should be made while old ones can be made serviceable. Tools can be cleaned, sharpened, and repaired. All these matters, if attended to now, will result in a saving of valuable time when the busy season starts, as start it surely will when the family demand for vegetable supplies becomes insistent.

Potatoes

To this vegetable pride of place should be given. Where the area of the garden is such as to allow of its production to an extent which may entirely meet the full demands of the average household this ought to be utilised. As the Hon. Minister of Agriculture is asking for maximum potato production this year, to meet exceptional demands, it is the duty and responsibility of every home gardener, whatever the extent of the area being cultivated, to ease what may later develop into an acute situation.

In respect to the utilisation of seed, a few observations here may be appropriate. As has been previously stated only sound tubers, specially selected from disease-free stock, should be used for planting. But this is not enough. When the seed has been chosen, it should be properly taken care of by placing it in seedling boxes with the "rose" end up and where there is plenty of light. Good air circulation is also essential. The short, vigorous shoots on the tubers, which are so necessary at planting time, can be secured only if these provisions are complied with.

A brief reference to an experiment which was carried out at Kew Gardens, England, in 1943 may be of interest to show how seed potatoes can be used in different ways, Majestic being the name of the variety with which the experiment was made.

	Gross Crop. lb.	Marketable Crop. lb.
Normal Seed	613½	558
Chats (small size) ..	474½	411½
"Eyes"	526	526

(Note particularly that all potatoes produced by the "eyes" were marketable.)

The same experimental conditions applied equally to the three methods of testing the productive capacity of each.

The evidence obtained from this reliable experiment—and anything from Kew Gardens can be taken as reliable, without question—suggests that three-quarters of the seed tubers may be used as food. This, in the aggregate, would represent a considerable saving of potatoes for consumption. After the outbreak of war with Germany it was the adoption of this practice which saved thousands of tons of potatoes for consumption by the Russian people, and at the same time enabled vast quantities of seed to be economically transported to other parts of Russia for production purposes.

Study Soil and Plants

A study of soil conditions in the vegetable-growing area is necessary if the best results are to be obtained from the crops which may be grown. This can be done only by observing the early growth, subsequent development, and condition at maturity of plants in different parts of the garden. A certain amount of knowledge of the plants being grown is also essential—their habits of growth, varietal characteristics, appropriate season during which they should be grown, approximate dates when seed can be sown, the plants set out, and, in addition, their food requirements. In a word, it is necessary to know your plants, provide the proper conditions for their healthy growth, and eliminate those conditions which tend to inhibit their proper development.

Lettuce

For spring cutting seed may be sown any time now. An outside seedbed is not necessary, as a small seedling box 10 inches square and 2½ inches deep will be large enough to grow more than sufficient plants for a single setting. Seed can be sown frequently at suitable intervals and successional plantings made, thereby maintaining a continuous supply. To secure early maturity a sheltered—not shaded—part of the garden should be chosen and the plants set out 12 in. apart each way in rich, well-drained soil. As cold and wet conditions are inimical to good development of lettuce plants, it will be better to raise the bed above the garden level. This will provide for the necessary drainage of surplus water. As slugs are prevalent during June, and, if unchecked, will quickly destroy the young plants, soot, if obtainable, may be carefully distributed round each plant in a way that it will not come in contact with the leaves. Burnt or hydrated lime can also be used to destroy slugs. As light applications of lime will not injure the plants, the best time to apply it is during the evening, immediately after dark. It is at this time that the pests are feeding, after having rested during the day. It should be applied broadcast along the row of plants.

Spring Cabbage

The recommendations just made for the protection of lettuce apply equally to spring cabbage plants. If set out in late March or early April, the young plants will now be well forward and lime, when being applied for the destruction of slugs or snails, should be thrown between the rows of plants. Considerable force is necessary when making the application; the main object aimed at should be to make the lime contact the under-side of the leaves, this being the part of the plant where the pests will invariably be found feeding.

These plants should be kept lightly hoed, and as weed control during the present season is difficult hand weeding may be the best method of keeping the rows clean. Immediately on removal the weeds should be put in the compost heap, or dug into another part of the garden.

Cauliflower

To obtain cauliflower for cutting during December seed may now be sown. The same provisions should be observed as those recommended for sowing lettuce. Whereas, however, lettuce seed may be sown broadcast, it is preferable to sow cauliflower seed in rows. If the seedlings are to be transplanted before being finally set out in the garden, a box the same depth as for lettuce will be suitable; but if the plants are to be fully grown in the box then a depth of 4½ to 6 in. will be necessary. One very important condition of successful cauliflower production may be referred to: From seed sowing to maturity, plants must never be checked in their growth or development. Premature seeding or "buttoning" of the heads is almost certain to be the result of neglect during the seedling stage. Good drainage is essential.

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.

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Seasonal Work for Beekeepers

Section Honey Production

JUST prior to the opening of the main honey flow colony entrances should be enlarged. Bottom ventilation plays an important part in the control of swarming when hives are worked for section honey. Colonies which have given no indication of any desire to swarm will lack any encouragement to do so if bottom ventilation is ample and those exhibiting definite signs of wanting to swarm will very often abandon their preparations.

By placing a one-inch block under each of the four corners of the brood nests the hives are thus raised completely above the bottom boards.

Swarm Control

An effective method of swarm control, but one that results in less sections being produced, requires the use of half-supers of extracting combs and also involves the application of queen-excluders for part of the season.

As soon as colonies are reduced to a single brood-chamber the section-honey supers are put on and immediately the honey flow starts supers of extracting combs are added above the section supers. As the flow begins to taper off queen-excluders are placed over the brood nests and half-supers of extracting combs added as required. By supplying the first extracting super at the beginning of the honey flow the bees are readily induced into the supers, thereby stimulating the colony and encouraging the bees to commence work in the sections without delay. Although fewer in number the sections produced by this method are usually well finished. In conjunction with any methods adopted to reduce or control swarming the laborious routine of examining colonies every eight days must not be neglected.

The first inspection of the brood-nest made eight days after the hives have been reduced to a single brood-chamber will disclose some hives as having made no preparation to swarm whilst others may have started queen cells. These cells will contain eggs, or larvae, only a few days old, the swarming impulse at this stage not having yet reached its height; consequently it will pay to break them down. Those colonies which make no effort to swarm usually produce the most honey.

The next examination should disclose those colonies which are unlikely to swarm during the season and also should give a definite indication as to which are likely to insist on swarming. The latter colonies will have built more queen cells which will contain larvae up to five days old. As these colonies are obviously going to swarm or loaf, a worthwhile crop cannot be expected from them unless drastic swarm-control measures are adopted.

Brood Removal

Where the hives preparing to swarm are strong and are headed by good queens they should have their brood removed in the following manner: The hive is lifted to one side and a fresh bottom board and super containing frames with full sheets of foundation put in its place. The colony is then quickly run through to locate the queen, which is transferred to a frame of brood. This frame, with adhering bees, is placed in the centre of the new hive. With the exception of a single bee-covered brood-comb the whole of the inmates of the hive are shaken before the entrance to the new hive, care being taken that the bees are not unduly smeared with the thin nectar that will be contained in the comb at this time of the year. The section supers on the original colony are placed on the new hive. The removed brood may be used for making increase or stacked with other brood taken from colonies similarly treated. Colonies formed with such brood soon become strong and are capable of harvesting considerable honey under favourable conditions. Even after treatment some colonies will persist in their attempts to swarm and where the honey flow is long-drawn-out colonies that have not attempted to swarm before may begin to do so now. In these circumstances three or four frames of brood removed and replaced with drawn comb or foundation will act as a deterrent.

Supersedure

Under stress of heavy egg-laying there will inevitably be a few queens that will break down and show signs of failing at a critical period of the season and the bees often display a desire to replace them by building queen cells. It would be useless to remove the brood of such colonies, the remedy being the replacement of the queens. The hives should be dequeened and all the cells (usually one or two only) that have been started broken down. After 10 days the colonies should again be examined and any further cells dealt with in a similar manner and young laying queens introduced. During seasons when the honey flow is prolonged little loss of crop would be experienced, as in colonies where the work is well under way in the sections before dequeening takes place the bees appear to be little affected. If, however, any slackening is noticed, the supers of sections on these hives should be exchanged with those of colonies which have completed most of their sections.

Less drastic measures are necessary as the flow draws to a close. It should be sufficient to break down any cells started in the few colonies that will still be trying to swarm.

Preparation for Market

Sections should be removed from the hives as soon as they are completely capped. The exposed outer surfaces of the sections should be scraped to remove propolis and all foreign material. The sections can be effectively cleaned by scraping with a sharp knife or rubbing with fine sand-paper. The knife is preferable when the weather is very hot as the propolis is inclined to soften. When using sand-paper care must be taken that the fine dust created does not mar the appearance of the comb. Sections should be graded into three classes, only those of full weight and finished appearance being included as Grade 1.

If sections have some kind of wrapping they are more hygienic as they do not come in contact with dust or other contamination. Containers for both comb honey and sections are made of heavy paper material suitably labelled. Some section cartons have cellophane windows which enable the prospective purchaser to see what he is buying. An attractive effect is obtained by wrapping the sections in coloured cellophane, but plain will do just as well.

Storing Comb Honey

Section honey should be stored at a reasonably steady temperature between 65 deg. and 85 deg. Fahrenheit. Fluctuating temperatures, and more particularly low temperatures, tend to hasten granulation of section honey. The honey should be stored where the atmosphere is dry.

—R. S. WALSH, Apiary Instructor, Auckland.

(To be continued.)

Notes for the Poultry Farmer

Importance of Good Housing

THE selection of the type of housing to be used for a poultry-farm is a matter of major importance. It involves the expenditure of a considerable amount of capital, and once erected the housing is intended to last for years. Thus, any initial mistakes made in this direction may influence adversely for a long period the health, production, and economic handling of birds, unless further money is spent to rectify any such mistakes. Poultry-housing generally is of simple construction and does not call for expensive materials, as compared with other types of buildings. While elaborate buildings will not necessarily give increased production, the poultry-farmer who anticipates establishing a farm from which to derive his livelihood is warned against the use of inferior materials and make-shift buildings. Such may appear to be cheap housing at the time of erection, but taken over a period of years they rarely prove to be a saving. Good housing properly located on a well-planned farm will prove its worth in the hands of the efficient poultry-farmer.

Briefly summarised, housing for poultry of all ages is required to afford the birds adequate protection, ample light, good ventilation, without draughts, and dry conditions. Birds should be rendered comfortable at all ages, and conditions which would appear unpleasant to humans, such as draughtiness, dampness, stuffy atmosphere, etc., are all likely to affect adversely stock and production and should be avoided.

The types of housing required upon a poultry-farm will depend upon the purpose of that farm, and the form of management adopted. With a view to covering the requirements of the majority of poultry-farms, mention will be made of the more usual types of housing in use in New Zealand at the present time. Alternative types of housing will be described where it is considered that such are likely to prove of value in certain districts where special climatic conditions exist.

Laying-houses

The ordinary lean-to house is the type of laying-house most commonly chosen in New Zealand. Owing to climatic conditions, partially open-fronted houses may be used with success. This fact assists considerably in affording ample light and good ventilation, while reducing the cost of housing appreciably. Figs. 1, 2, and 3 illustrate an end elevation, a front elevation, and a plan respectively of a standard type of laying-house. Figs. 4, 5, and 6 are photographs of typical lean-to houses

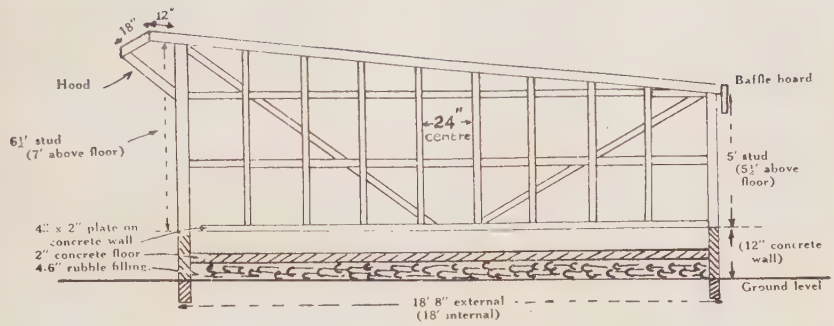

Fig. 1.—End elevation.

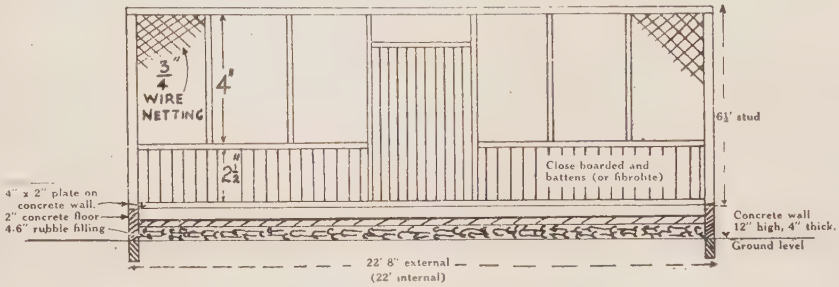

Fig. 2.—Front elevation.

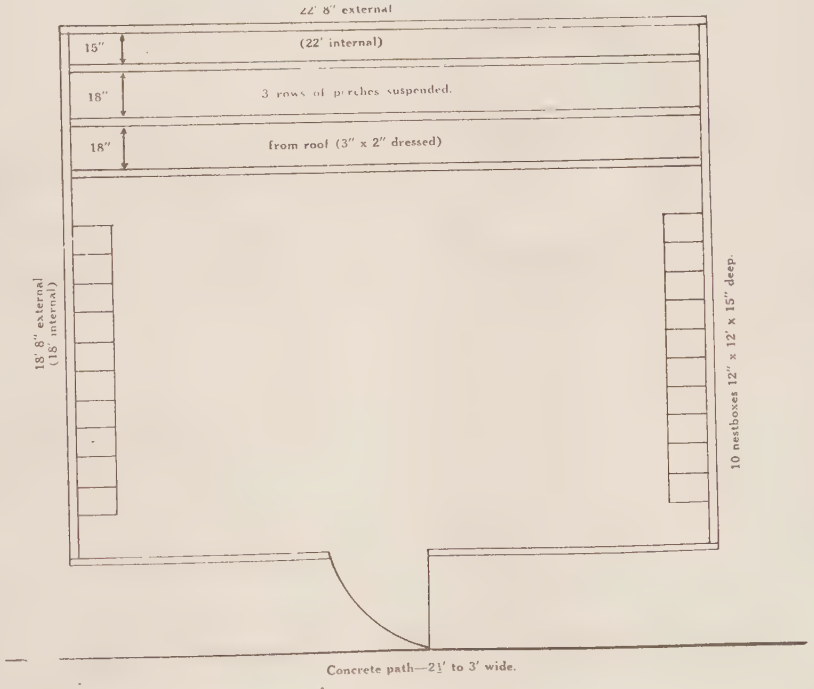

Fig. 3.—Plan.

of the type which has the front of the house higher than the back. Obviously there are small variations in regard to the position of the door, the type of hood used, etc., on different farms, but all are suitable for both intensively and semi-intensively managed laying flocks. The amount of floor-space per bird required varies with the two systems, reference to which fact will be made later.

In certain districts where cold winter weather is experienced preference is shown by a number of poultry keepers for a lean-to house with the front lower than the back. Fig. 7 illustrates this type of house. It can be claimed that the low-pitched rays of a winter sun reach the birds more easily, and in general this type of house gives warmer housing conditions.

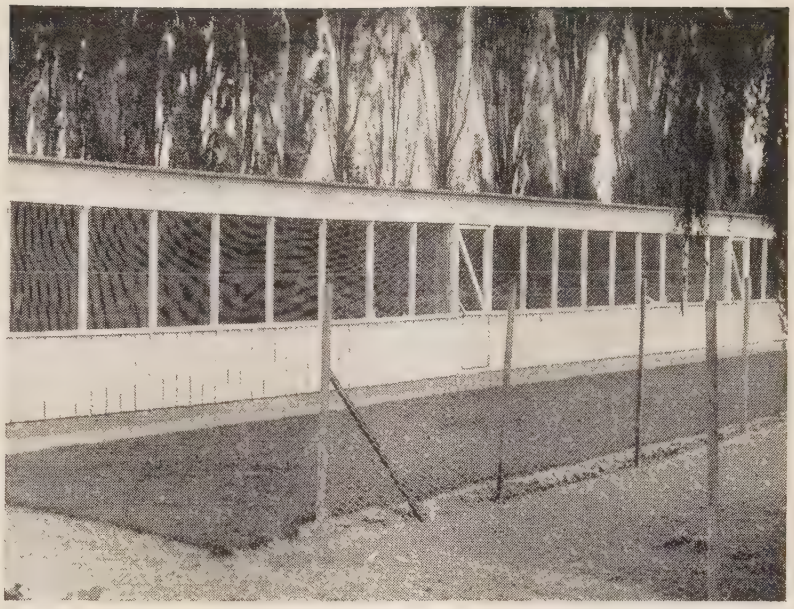

Fig. 4.—Lean-to laying-house used for intensive management.

General Specifications

1. Size of House—Floor-space: The measurement of a house is controlled by the size of flock it is desired to maintain and varies according to the system of management; hence the following floor-space per bird housed should be allowed—(a) For intensively-housed birds, 4 to 4½ sq. feet and (b) for semi-intensively housed birds, 3½ sq. feet. The depth of the house must be sufficient to afford ample protection to birds while roosting on perches fitted at the back of the house. Poultry-farmers vary in their opinions as to the desirable depth of a laying-house, and these variations range between 16 and 20 ft. It is suggested, however, that 16 ft. is satisfactory for semi-intensive laying-houses, and 18 ft. for intensive housing. Thus, having fixed the depth, it is an easy matter to divide the depth in the total number of square feet of floor-space required for any given unit, and thus

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obtain the necessary width of the house.

For 100 birds—					
Semi-intensive	22	ft. wide,	16	ft.	deep
Intensive (maximum)	25	,, ,,	18	,,	,,
For 50 birds—					
Semi-intensive	12	,, ,,	16	,,	,,
Intensive	14	,, ,,	16	,,	,,

(With the smaller unit the depth of the house may be decreased and the width increased for intensive purposes.)

2. Height of House: Here again poultry-farmers vary in their opinions. For general purposes an inside measurement from floor to roof of 7 ft. to 7 ft. 6 ins. in the front and sloping off to 5 ft. 6 ins. to 6 ft. inside measurement at the back is recommended. Houses greater in height are to be found, but the measurements given will be satisfactory, **providing** proper ventilation is given (see note on ventilation). Where houses are made larger in cubic capacity than is necessary they are apt to be cold in winter. Against this, however, the measurements given may be increased slightly for housing in the Auckland district, where climatic conditions demand the maximum of ventilation and air capacity. It will be noted that with the measurements of height for the front and back of the house a roof fall or slope of approximately 18 in. is allowed. With roofing material normally in use for poultry-housing not less than 1 in. fall for each foot in depth of house is recommended.

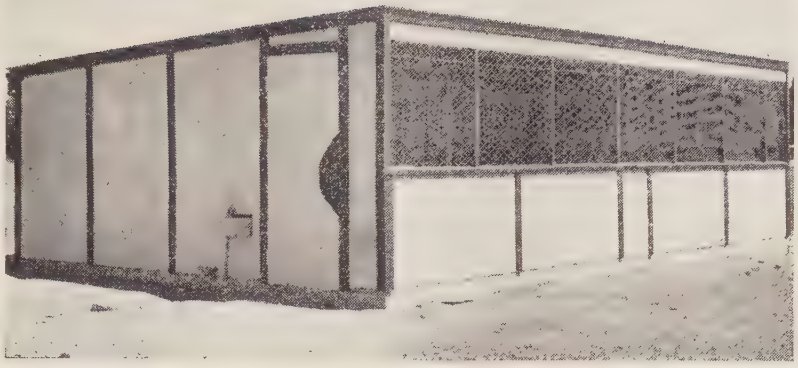

Fig. 5.—Lean-to laying-house used for semi-intensive management.

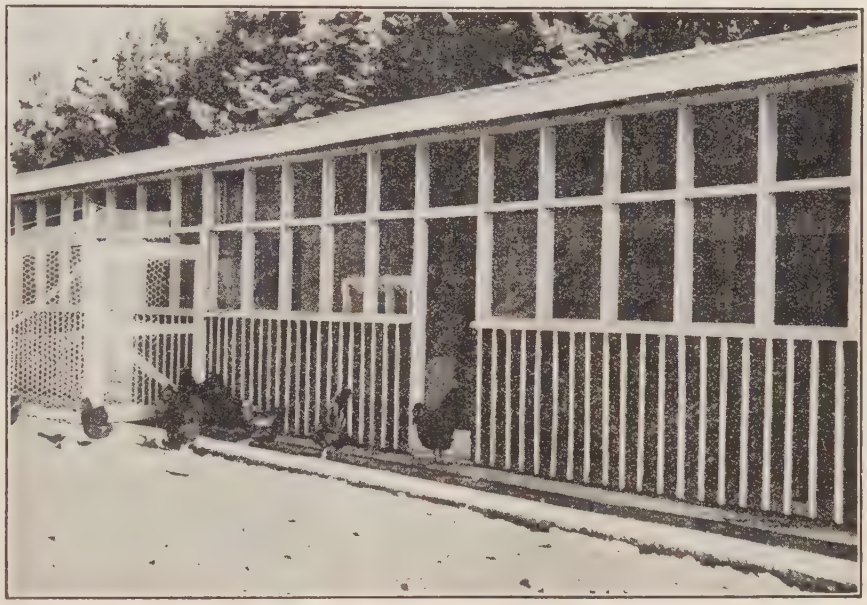

Fig. 6.—Range of laying-houses.

3. Ventilation: Efficient ventilation without draught is of the greatest importance in poultry-housing. The health of the birds, their freedom from colds, and the condition of the litter in the house will all be affected by ventilation. If birds are to be maintained in perfect health they must have an ample supply of fresh air (oxygen), while stale air laden with the by-products of the processes of the birds' bodies should be removed from the house. Stuffiness in a house is as liable to cause colds in birds as a direct draught. Furthermore, an inadequately-ventilated house will tend to produce an atmosphere higher in moisture content than is necessary or desirable. This occurs more particularly during the winter months. Should these conditions exist, it will be appreciated that the litter is liable to absorb moisture from the air, and ultimately become damp—a condition definitely injurious to the health of birds and a frequent cause of colds and roup.

It is desirable, therefore, to have a steady flow of fresh air passing through the house, but without the presence of draughts. With wire-netting forming the greater proportion of the front of the house adequate provision is made for a free exchange of air at the front, but this should be augmented by additional ventilation at the back of the house. This is best supplied by a gap between the upper plate on the back wall and the roof. This gap will be 4 in. in depth where 4 in. by 2 in. rafters are used. Where such a gap is left unprotected it is possible, with a strong wind blowing on to the back of the house, to get a draught through the house, but if the rafters are extended

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Fig 7.—Lean-to laying-house with front of house lower than the back.

for 6 in. beyond the back wall, and a 6 ft. x 1 in. or an 8 ft. x 1 in. baffle-board is attached to the ends of these rafters, then air can still pass freely into the house, but no draught is possible, however strong the wind may

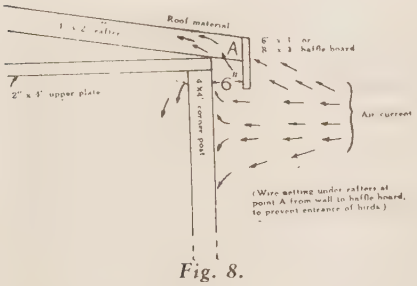
Roof material
A
6"
2" x 3" upper plate
Air current
(Wire netting under rafters at point A from wall to baffle board, to prevent entrance of birds.)

Fig. 8.

be on the back of the house. Fig. 8 illustrates this method of ventilation. In the Auckland Province it may be found that this amount of ventilation is inadequate during the summer months. This can be improved by allowing a gap of greater depth than 4 in., or by placing special adjustable or controllable openings in the back of the house.

Where it is intended to construct a long house, to be divided into pens, under most conditions (Auckland again excepted) it is advisable to have solid wooden partitions between each pen, to prevent draughts, which occur in a long-tubular-shaped house.

It is not possible here to describe the several methods of ventilating laying houses which have a full-span or apex roof, but poultry-farmers are advised to discuss ventilation methods with someone experienced in this matter before constructing houses of this type. It will be found that the old-fashioned type of ridge caps at the apex of the roof are liable to result in bad down-draughts during a strong wind. Such draughts are undesirable and can be avoided by a proper type of ridge ventilation.

4. Protection Against Rain at the Front of the House.—With an open-fronted house there is a danger of rain driving in with a wind blowing directly on to the front of a house during a storm. This trouble can be obviated to an appreciable extent by an extension of the roof, either straight-out for about 2 ft. 6in. following the roof-line, or by a hood of the type illustrated in Fig. 9. Such an extension or hood will also afford some protection from rain to the poultry farmer when passing down the front of the house during inclement weather.

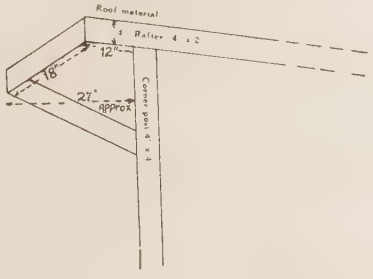

Fig. 9.

5. The Floor.—It is highly desirable that the floor of a laying-house should possess two principal characteristics, namely, that it is dry and that it lends itself to easy and thorough cleaning. **To obtain a dry floor the floor-level inside the house should be well above the level of the ground surrounding the house.** This is a most important point to bear in mind when constructing a poultry-house. An additional precaution in the case of a concrete floor is the use of a hard core of stones, rubble, etc., placed under the 2-3 in. of concrete which constitute the floor itself. Where wooden floors are used they should be kept at least 6 in. above ground-level, to allow the free passage of air under the floor. It is preferable to raise the floor higher to allow of access under the house in case rats establish themselves there.

Earth floors cannot be recommended, since they are difficult and laborious to keep clean. Should disease break out, much of the earth must be removed and fresh supplied, whereas with concrete and wooden floors with a smooth surface cleaning and disinfecting are rendered comparatively easy. Good concrete floors are entirely satisfactory for poultry and are an asset in the control of disease. The surface should be floated off, to give a smooth surface, which facilitates cleaning.

6. Building Materials.—In general, difficulties exist today under war conditions in obtaining building materials for poultry-housing. The materials are, however, available to all poultry-farmers if the correct procedure for obtaining them is followed. To those who are uncertain of this procedure it is strongly recommended that they get into touch with the Poultry Instructor for the district, or write direct to the Department of Agriculture, Wellington. It should be noted that corrugated galvanised iron is **not** available to poultry-farmers, but that timber and asbestos sheeting, both plain and corrugated, are available. Where preferred, timber and roofing felt may be used as roofing material. The latter is not controlled, and does not require a permit for release. It may be added that asbestos sheeting is now being used satisfactorily for walls and as roofing material, in place of galvanised iron commonly in use when supplies were available.

—F. C. BOBBY, Superintendent of Poultry Husbandry, Wellington.

(Continued.)

"The Theory and Practice of Poultry Feeding" (Bulletin 198) has just been published and is on sale at 6d. per copy (post free) at the offices of the Department of Agriculture at Auckland, Wellington, Christchurch, and Dunedin. It contains information of value to all interested in egg production.

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Federation of Young Farmers' Clubs

A Typical Y.F.C. Annual Report

THE following report, presented by Mr. McGregor Donald, chairman of the Bunnythorpe Young Farmers' Club, should be of interest to all associated with the Y.F.C. movement. The report has been selected, not necessarily as the best report received, but as a typical annual report, setting out clearly the club's endeavours and activities during the past year. The report has obviously taken a considerable amount of thought and preparation, and it is certainly a credit to the club chairman. The activities undertaken and so successfully carried out are an indication of what is being done by so many of our clubs under present-day difficulties and handicaps.

SIXTH ANNUAL REPORT OF BUNNYTHORPE YOUNG FARMERS' CLUB.

IT IS with pleasure that I present to you the sixth annual report of the Bunnythorpe Young Farmers' Club. As in the previous year we have had to contend with many difficulties in trying to maintain our number of different activities, nevertheless I am sure members will agree that the past year has been full of interest and the monthly meetings most enjoyable.

The club began the year with a membership of 14, and during the year the numbers increased to 18 active members. The members on active service are: G. Bennett, C. Cheetham, A. Gee, G. McKenzie, N. Maul, A. O'Donnell, and A. J. and L. E. Cocker. Of these members we regretted to learn that Norman Maul some time ago was posted as missing over Burma. He was one of our keenest members, and we earnestly feel for his safety. During the year a fund was created and a parcel dispatched to each of these members, and it is good to learn at this early date that at least one has arrived at its destination and incidentally while its recipient was in action in Italy. With seven on active service, Alan Ditmer in the home forces, and 18 active members, making a total of 26, as one of the three remaining active clubs in the Manawatu district area I think we have reason to congratulate ourselves.

During the year we were favoured with addresses by the following speakers:—Mr. A. F. McKenzie, Mr. H. de O. Chamberlain, Mr. Hewitt, Mr. Jacques, Mr. H. Robson, and two active members, Messrs. S. Anderson and B. Neylor, the two last-named being the only members whom there was time to hear on the two occasions when all were to have prepared a lecturette. To the previously named gentlemen we owe a debt of thanks for their interesting and informative addresses.

Potato Competition.—This competition, instigated by Mr. A. J. Galpin in 1942, reaching its close in the autumn of this previous year, provided much interest and practical knowledge, and I am sure we all agree the effort was well worth while. We thank Mr. H. de O. Chamberlain, whose duties as judge were arduous, for his explanations and comments during the two field days and finally at the monthly meeting when he announced the winner. We congratulate Mr. S. Anderson, the winner, and Messrs. R. Clevely and G. Wiggins, who came second and third respectively. Our thanks are also due to Mr. R. Clevely for his report which recently appeared in the Journal of Agriculture.

Parents and Friends Evening.—It was regretted that the club was not in a position to make this evening the success it was previously. However, I am sure that those who did venture out on the cold winter's night did enjoy the evening, and we express our thanks to Mr. Brian Low for his address on "China As I Saw It."

Annual Dance.—As you are well aware, the proceeds were donated to the local soldiers' Parcels Fund. The function was well attended, an enjoyable evening being spent by all. The contribution to the fund was perhaps not considerable, nevertheless I do think this is one way in which we can and should assist.

Y.F.C. Section in Bunnythorpe Women's Institute Show.—Our thanks are due to the Women's Institute for allowing us to conduct our own section in their show. Members were of the opinion that the classes in our section should be more comprehensive in that there should be field crop classes. The entries, however, due mainly to the exceptionally dry season, were disappointing. Should there be another occasion on which we will have our own section, I urge members to wholeheartedly participate in it, for this provides an excellent avenue for us in "learning by doing" or perhaps more correctly "learning by growing." We congratulate Mr. R. Clevely in securing most firsts and thereby winning the points prize.

Reading of Constitution.—Various younger members of our club during the earlier part of the year read extracts from the constitution. This was helpful, but unfortunately little or no emphasis was laid upon the interpretation of the clauses, apart from

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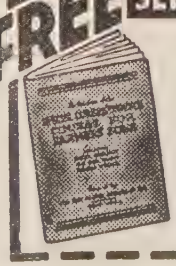

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J.A.

the objects of the movement, which really are self-explanatory. I am sure that if a short while were set aside at our meetings for the interpretation of the clauses as set down in the constitution members—especially new members—would find it interesting, besides it being the one way by which the purposes and objects of our organisation would become known.

Acting Chairman.—Undoubtedly we were all pleased to see acting as chairman, on four occasions, the younger members of our club. We hope that they value their experience and that we will see them occupying that post in meetings to come.

Hon. Secretary.—Our special thanks are due to Mr. Brian Fowler in carrying out the duties of the office with effect. For the interest and enthusiasm he takes in the Y.F.C. movement, for his untiring efforts in seeing to supper arrangements and the regular and numerous duties pertaining to his position, and the assistance he has given me from time to time, on behalf of the club and myself I offer him our sincere thanks.

To our advisory president, Mr. Linklater, to Mr. McKenzie, who again acted as auditor, and to other advisory members, Mr. Stewart, Mr. Gunn, Mr. Galpin, and Mr. Robson, we offer our thanks for their continued interest in the club's welfare.

In conclusion, I would like to thank all for their attendance at meetings and for the co-operation which I have received at all times. I value highly the Y.F.C. movement, and by the interest and enthusiasm with which you as members regard the affairs of the club undoubtedly you, too, share that same view. I am sure that we can look ahead, being confident of our club's future, and that when victory is won and our fellow-members on active service are with us again (which we hope and pray will not be many more months) we shall be able to take a more active part in the welfare of our organisation as a whole, and thereby play a valuable part in what vitally concerns all, "The Plan of World Reconstruction."

"Farming in Denmark"

AT a recent meeting of the Kaukapakapa Young Farmers' Club a talk entitled "Farming in Denmark" was given by Mr. John Rasmussen. The following report of the talk has been prepared by Neil Barr, a member of the Kaukapakapa Club:—

Mr. Rasmussen, who among other things had been a butter-maker and farmer in Denmark, delivered a highly interesting address. He spoke of the popular type of farming in Denmark—dairying of a highly-intensive nature. The cows were led out "in column of four" and tethered on the pastures. They were all hand-milked, and the milk was delivered to the creamery, where it was separated and made into butter the following day. On being questioned as to why the quality of Danish butter was superior to ours, Mr. Rasmussen stated that he did not think that New Zealand butter was inferior in quality to Danish, but owing to the difference in manufacture the latter was a more palatable article. In New Zealand the cream was pasteurised and then made into butter; but in Denmark, after pasteurisation a culture of *Streptococcus lacticus* was introduced, and when the cream had soured the butter was made. This gave the Danish butter the flavour that was so appreciated. This butter would not, of course, keep long, and would be out of the question in New Zealand, except perhaps under some new methods of transport or preservation.

The speaker also mentioned the highly concentrated dressings of lime that were applied to pastures, and the amount of cropping that was done for the herds. There were no fences, only stones to mark the corners of the boundaries. All the milking was done by women (this set a buzz of comment going among the audience!).

The education of the young farmer was undertaken in a very thorough manner. After completing his primary education the budding farmer worked for some years on farms, and then went on to an agricultural school or college. Here he was trained as a citizen and a farmer.

In the speaker's day Denmark was a land almost free of inspectors, the only two being the boiler-inspector and the policeman; the latter had so little to do among this law-abiding people that he did a little inspecting in his spare time. If the standard of cream from a district was not good, a party of directors of the co-operative butter factory visited that district, and after a friendly talk with the farmers the quality invariably improved.

This talk was the first of a series in which it is intended to invite speakers with experience of farming in other countries, and so take advantage of their wide store of knowledge.

Stock Judging Contest

A stock judging competition, under the auspices of the Mid-Canterbury Y.F.C. District Committee, was held recently at Longbeach.

About 45 members of the Methven, Ashburton, and Hinds Young Farmers' Clubs competed for a shield donated by the Farmers' Union. Taking into consideration the difficulties of transport and the short-handedness of farmers at the present time, this attendance was gratifying.

Corriedales (both shorn and in the wool), Southdown ewes, and dairy cattle were judged by the competitors, who worked in teams of three. Mr. J. H. Grigg adjudicated in dairy cattle and Corriedales, and Mr. R. J. Low in Southdowns.

The winning team comprised Messrs. R. Cocks, W. Taylor, and W. Keeley, of the Hinds Club.

Exceptional ability was shown by R. Cocks, who was awarded the prize donated by Mr. Grigg for the best individual competitor.

Although the test was a stiff one, the standard was high, said Mr. Grigg. There were 12 decidedly good papers, the others being fair. Reports on the dairy cattle were good, showing that competitors had a good grasp of the subject. Most interest was shown in the judging of eight Corriedale ewes in the wool. Intelligent descriptions of the sheep, more than correct placings, were considered in the marking of the papers.

Commendatory remarks on the work of R. Cocks, made by Mr. Grigg, were endorsed by Mr. Low.

Y.F.C. in Front Line!

AN interesting letter has been received by Mr. A. J. Galpin, of Bunnythorpe, from Russell Hillas, formerly secretary of the Otaki-Te Horo Young Farmers' Club. Gunner Hillas writes from New Caledonia, and states that while with a forward battery, in a position which they held for some considerable time, he and others formed a Young Farmers' Club. They held meetings under difficulties, but had some very interesting times, mainly occupying themselves with general discussions on farming and other topics. This piece of news will doubtless be of interest to his old clubmates, and to everybody in the Y.F.C. organisation. We wish him the best of luck and a safe and speedy return. His address is: Gunner R. Hillas, 140236, 49th. Battery, 38th. Field Regiment, 2nd. N.Z.E.F., I.P., A.P.O. 150.

Bulletin No. 193. Ropes, Useful Knots and Splices, is available free from the Department of Agriculture.

Reports on Club Activities

WESTERN SOUTHLAND.

Orepuki.—Arrangements for annual meeting. Members of the W.D.F.U. and Farmers' Union to be invited, and an impromptu debate to be held. C. E. Haslam, a club member, generously donated 10/- towards the cost of supper at the annual meeting. An A.T.C. appeal for recruits from the club was made by Sgt. Wright and Capt. Murray. An essay competition to be held among members of the club. An impromptu debate took place, the subject being "That a College Education is of More Value Than Practical Farming Experience." Speakers: C. N. Erskine, R. C. McCracken, J. Griffin (affirmative): K. Corkery, A. Lee, W. G. Brown (negative). The negative team were adjudged the winners by five points. At the previous meeting a letter was received from Gnr. Gordon Stuck, a member of the club, who has formed a Young Farmers' Club in his unit in the Pacific; he appealed to the club for books and literature. The secretary was instructed to write to Gnr. Stuck and also to F/Sgt. A. McPherson, another member of the club who had formed a Y.F.C. in his unit overseas, congratulating them both on their achievements. A Servicemen's Fund was established for the purpose of raising funds for a presentation to each member overseas on his return. Mr. M. Young was appointed treasurer of this fund. The second part of the meeting took the form of the screening of film strips on the following subjects:—Superphosphate, Wheat, Cocoa, and Wool. The films and projector were forwarded to the club by Mr. S. R. Whyte, hon. secretary to the Otago-Southland Council. An interesting field day was held at Messrs. J. R. Mills and Co., Ltd., Invercargill. Members were enabled to see the operations of wool-classing, binning, skirting, rolling, and pressing; the party was shown around by Mr. Mills, who explained everything in detail. Twenty-two members attended the field, and 24 and 16 at the two meetings respectively.

SOUTH OTAGO.

Warepa.—Arrangements for a working bee to prepare ground at the Warepa Corner for the planting of two trees in memory of two members who have been killed on active service. Decided to ask Mr. Hayhurst to demonstrate on colts at the next meeting. Talk by Mr. W. Miller on "Fencing." The speaker described fully how to erect a seven-wire fence. Eighteen members attended out of a total of 21.

DUNEDIN.

West Taieri.—Annual meeting. Officers elected: Advisory president, Mr. H. Gibson; chairman, L. Doherty; secretary and treasurer, J. Cameron. Fourteen present at the meeting.

NORTH OTAGO.

Enfield.—Evening spent in impromptu speeches. Date of annual meeting fixed. Eleven members present out of a total of 20.

SOUTH CANTERBURY.

Geraldine.—At meetings previously unreported the following talks, etc., were given:—Mr. Johnston, "The Breaking-in of Clay-bottomed Land"; talk and demonstration on "Splicing Ropes" by Mr. E. D. Templar; "New Caledonia," by Lieut. Roy Crotty. Arrangements were made for two club debates, the subjects to be (a) "That New Zealand Would Benefit by a Larger Population," and (b) "Can New Zealand Become Self-supporting?" Attendances at the meetings varied from 12 to 16 members.

MID-CANTERBURY.

Hinds.—Annual meeting. Officers elected: Advisory president, Mr. H. Chisnall; chairman, W. Taylor; vice-chairman, A. McKenzie; secretary, J. R. Cocks; treasurer, I. Donaldson; hon. auditor, Mr. T. P. Lowe. Eleven members present.

Methven.—Annual meeting. Officers elected: Advisory president, Mr. R. J. Low; chairman, A. McKay; deputy chairman, W. Hart; secretary, A. Grigg; assistant secretary, J. Watson; treasurer, J. Dixon. Two new members enrolled. Short talks on any subject to be given by all members present at the next meeting. Twenty-five members attended out of a total of 57.

NORTH CANTERBURY.

Scargill-Omihi.—Annual meeting. Officers elected: Advisory members, Messrs. J. Sloss, W. H. Brown, B. Black, and J. Wyllie; club chairman, J. M. McMillan; secretary and treasurer, H. N. Munro. Address by Mr. H. Symonds on "Fiji." There was an attendance of seven members out of 33.

MANAWATU.

Bunnythorpe.—Annual meeting. Officers elected: Advisory president, Mr. J. Linklater; advisory members, Messrs. Gun, Stewart, Galpin, and McKenzie; chairman, S. Anderson; secretary, B. Fowler; treasurer, B. Neylor; club reporter, R. Clevely; hon. auditor, Mr. A. F. McKenzie. At a previous meeting a talk was given by S. Anderson on "Russia." At the recently reported meeting a remit was framed for consideration by the District Committee, as follows: "That the Y.F.C. Memorial take the form of Agricultural Scholarships at Massey and Lincoln Colleges." A further remit was carried, "That it be a recommendation to all clubs to open accounts under the National Savings Fund scheme, with the ultimate object of devoting such moneys, and the interest accruing upon repayment, wholly or partly to the Y.F.C. Memorial Fund." It was decided to forward letters to Squadron-Leader E. W. Barnett, wishing him a speedy recovery from his illness, and to Mrs. B. E. Leete, tendering the members' sympathy on her husband being wounded. There was a good attendance at the annual meeting: Messrs. S. G. Avery (Wellington Council chairman and Dominion vice-president) and Mr. S. Freeman (Dominion organising secretary) were both present and addressed the meeting.

Rongotea.—Arrangements for annual meeting. Address by Mr. Mountjoy on "New Zealand and the Post-War Period." Eleven members present out of a total of 27.

WAIRARAPA.

Alfredton.—Annual meeting. Arrangements for club's annual ball. Officers elected will be reported at a later date. Ten members present.

Carterton.—Annual meeting. Officers elected: Advisory president, Mr. E. Bliss; advisory member, Mr. W. B. Campin; chairman, T. McQueen; treasurer, J. Rose; secretary, T. Fell; club reporter, V. Gates. Arrangements to be made with W.D.F.U. for social evenings to be held during the winter months. Two new members enrolled. Attendance of 16 members.

Masterton.—Annual meeting. Officers elected: Advisory president, Mr. D. McLachlan; chairman, W. D. Buick; secretary, H. A. James; treasurer, I. Rayner. Forty-one members present.

SOUTHERN HAWKE'S BAY.

Dannevirke.—Annual meeting. Officers elected: Patron, Mr. H. S. M. Quigley; advisory president, Mr. L. Feierabend; chairman, V. Cammock; vice-chairman, W. Limbrick; acting secretary, J. L. Sutherland; treasurer, B. Barker; hon. auditor, Mr. L. F. Allen; advisory members, Messrs. G. Cammock, W. N. Russell, H. M. Tatare, H. Chrisp, W. Chisnall, K. J. Holyoake, M.P., D. T. Scott, W. Welsh, H. H. Phillips, and R. J. MacDonald. Mr. B. Bary tendered his resignation as an advisory member, owing to his transfer to another district; this was accepted with regret. Mr. S. G. Avery (Dominion vice-president and chairman of the Wellington Council) was present and gave a talk dealing mainly with the work of the Wellington Council. The total club roll comprises 77 active members, including 32 serving overseas and 19 new members; there was an attendance of 42 at the meeting.

WANGANUI.

Taihape D.H.S.—Annual meeting. Officers elected: Advisory president, Mr. W. Bilbrough; chairman, H. Bennett; secretary, F. Ewart.

TE KUITI.

Paewhenua.—Annual Meeting. Officers elected: Advisory president, Mr. P. D. Crowley; chairman, J. Mewted; deputy chairman, W. Pepperell; secretary, G. Morris; treasurer, G. Schultz; hon. auditor, Mr. Thos. Hastings. There was an attendance of 15 members out of a total of 19. Tentative arrangements were made for the annual ball.

BAY OF PLENTY.

Paengaroa.—Annual meeting. Officers elected: Advisory president, Mr. J. B. Cawte; chairman, I. Spratt; secretary, I. B. Vant; treasurer, M. Steel. The Dominion president, Mr. T. E. Streeter, was present, and addressed the meeting on the position of the Y.F.C. movement throughout the Dominion. There was an attendance of 28 members out of a total of 53. At the previous meeting the chairman gave a brief survey of the business transacted at the Auckland Council meeting held on February 25. Mr. Cawte addressed the meeting on the duties of the officers of the club, and two members, J. Rhodes and R. Russell, gave short accounts of their experiences at Feilding Agricultural High School. Twenty-seven members present.

Te Puna.—Annual meeting. Officers elected: Advisory president, Mr. S. Williams; chairman, J. Phipps; secretary, V. Gibson; treasurer, J. Bidois. Fourteen members present.

Whakatane D.H.S.—Annual meeting. Officers elected: Chairman, P. Gow; secretary, R. Law; treasurer, J. Cameron. The programme for the ensuing year was discussed, and the following visits were proposed:—A market garden at Te Teko and the Rangitaiki Dairy Factory. Fifty-three members were present. Subsequent activities included the following:—A visit to a local machinery agent, a demonstration of a maize picker being given; a report by the chairman, secretary, and treasurer on the meeting of the Auckland Council, which they attended as delegates; a talk on "Bee-Keeping" by Mr. I. Hubbard; and an impromptu debate, the subject being, "Can New Zealand be Self-supporting?"

WAIKATO.

Cambridge.—The meeting stood in silence for a few moments in respect to the memory of the late Cpl. E. A. Anderson, a former secretary of the club, who was killed in action overseas. Discussion took place on the sending of parcels to overseas members. Decided to hold a club dance. A debate was held, the subject being "Town v. Country." The speakers were as follows:—A. Feisst, G. C. Herbert, R. Giles, and W. Searle (Town); G. Goodwin, R. Lang, E. Searle, and M. Russell (Country). The adjudicator, Mr. G. A. Walsh, gave the decision to the team supporting Country. At the conclusion of the debate Mr. Walsh tendered some very sound advice on the conduct of debates, and went on to explain the importance of the Y.F.C. movement, and the part that it can play in producing leaders in the farming industry. He urged members to realise that the future of democracy depends upon the ability of the youth of today to overcome the "laissez-faire" attitude produced by the easiness of modern life. There were 14 members present out of a total membership of 44.

NORTH AUCKLAND.

Kaukapakapa.—Annual meeting. Election of officers. Arrangements for a dance. Proposed that meetings be held in the outlying districts. Talk by Mr. R. E. V. Seaman on his trip from England to New Zealand. There was an attendance of 19 members out of a total of 35. Full report of a talk by Mr. John Rasmussen, on "Farming in Denmark," at a previous meeting, has been prepared by Neil Barr, a member of the club, and is published elsewhere in this section.

Health Notes for the Farm

Indigestion May Be a Warning

Contributed by
The Department of Health

THAT touch of stomach discomfort you occasionally get after meals may be just a passing upset with no important significance; but on the other hand it may be a warning. Indigestion, or dyspepsia, is one of the most frequent causes of distress and unhappiness.

Its common everyday prevalence has given rise—and understandably so—to the all-too-common misconception that indigestion is, in itself, a disease. It is not a disease—it is more accurately the symptom of disease, or perhaps the result of some physical trouble. Something is wrong somewhere. Maybe it is merely faulty diet. This lends itself to ready correction. Maybe bad eating or drinking habits are the cause of it—lack of exercise, perhaps, excessive smoking, fatigue, overwork and worry—any of these is liable to upset the digestion, but there are obvious, and, as a rule, straightforward ways of correcting these faults.

A Different Story

But persistent indigestion is a different story. In perfect health an individual is completely unaware of the processes occurring within his alimentary canal, with, of course, the exception of the sensation of hunger and the need for evacuation. When the alimentary processes, apart from these two exceptions, obtrude themselves into a person's consciousness, we speak of indigestion. And persistent indigestion can be indicative of a very serious disease. For instance, it might point to disease of the gall bladder, of the kidneys, of the heart; it might be caused by chronic appendicitis, or an ulcer, or perhaps cancer. As a matter of fact the danger that cancer is the cause of persistent indigestion becomes an increasing possibility after one has reached the age of 45 years. Any middle-aged person who finds himself suddenly afflicted by indigestion after being untroubled by it previously should seek medical advice at once.

While it's true that the underlying cause of indigestion may be serious, it's also true that most of the serious diseases which give rise to indigestion—and that includes cancer—can be treated with good chances of success when recognised in time. The worst way to try to correct indigestion is to indulge in self-treatment. This is a practice that suggests itself to many people much too readily, and is liable to have very serious results. If the indigestion is really caused by disease, then self-dosing may be dangerous—particularly in a case of appendicitis, for instance.

Seek Diagnosis

No matter what your age, the right thing to do is to consult your doctor without delay when you find dyspeptic symptoms persisting. Modern science has placed at his disposal wonderfully accurate methods of examination and analysis, and with these he can make a proper diagnosis and determine what treatment your case requires.

But he must have the patient's co-operation. If he hasn't then all his skill and all the technical aids with which he works are robbed of their full effectiveness. The biggest help your doctor can get in helping you is for you to take your case to him without delay.

There is a natural reluctance on the part of people to face up to the doctor's verdict, and it's because of this that many cures are denied them. It is a big mistake, sometimes a tragic mistake. If you've got something wrong, and you seek treatment at once, your chances of successful treatment are excellent. Those chances recede the longer you put off examination. And if you've nothing wrong with you—well, what a load off your mind.

Persistent indigestion is not to be taken lightly, especially in the case of the middle-aged people. But no matter how old you are, if you have it, see your doctor immediately and place yourself confidently in his hands.

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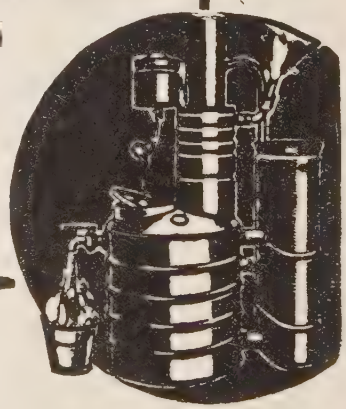

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THE GOOD NEIGHBOUR.

YESTERDAY I went to a birthday party. I don't know when I have enjoyed myself more, though no special effort had been made for my entertainment and it was not a grown-ups' festivity at all, despite the presence of quite a few adults—several mothers, two grandparents, an aunt by proxy and a proud father. You see, my host had just attained the important age of five and was celebrating the occasion with due dignity.

We played all manner of games—Hide and Seek and Oranges and Lemons, Farmer-in-the-Dell and Nuts in May, and finished up with a most exciting Treasure Hunt. Then we decked ourselves in gaily-patterned paper hats and went in to tea. The "Ohs" and "Ahs" of the young guests as they viewed the decorated table, the appetites with which they reduced its party fare must have more than repaid my hostess for her efforts. Besides the jellies and trifles there was an enormous cake made entirely of ice-cream with hundreds and thousands sprinkled on top, and even Master One-and-a-bit managed his spoon well enough to consume two helpings. Then came the birthday cake itself in all its glory of pink and white icing, and the candles were lit and the childish voices sang "Happy Birthday" and everyone made a wish before the tiny, glowing flames were puffed out.

As I watched that shining ring of eager little faces in the candlelight I thought how worthwhile it is to bring happiness to a child, and what power is given into the hands of parents to make of childhood a joyous emblem, jewelled with delight and laughter. We cannot shelter them from the trials and sorrows of later life, but while they are small and in our care we can surround them with love and gladness so that they will have an unshakeable faith in goodness, truth and beauty with which to face whatever the world brings. For children are "the hope of the world and of their homes; they are the mirrors in which older and sadder people see a bright reflection of their own earliest selves; they are the clean pages upon which the future may copy our fair past."

Five Candles

You often hear people say, "I would like to buy a bicycle" — or a doll — or whatever their choice—"if only I had the money." They quite overlook the fact that so many of the things which give children pleasure take very little money at all. See how a toddler will cling to a battered rag animal or play with a few pegs and a pot-lid while a more expensive toy is often pushed aside and forgotten. THOUGHT and TIME and TROUBLE: these are the greatest cost of that priceless heritage which is the birthright of every boy and girl—a happy childhood. Geraldine Ross has expressed this very aptly in her verses "For Mothers in War-time":—

"We must remember to read fairy tales,
To buy small boats with brightly coloured sails,
To bake plump, crunchy men of gingerbread,
And press a warm kiss on a sleepy head.
. . . . We'll keep gay ribbons tied, and soft hair curled,
While we march staunchly toward a better world."

Mary

First Time

"Show a two-year-old the full moon and stars for the 'first time' and you share its amazed wonder, as if it had made the night sky new for you yourself again. So it is with the 'first seaside,' the 'first Christmas Tree'—the heaven that lies around the child illumines your own horizon, so that your world has a rebirth, a spiritual renaissance."

—Sylvia Lind.

"People of Importance"

THOSE of you who have read that delightful book "Important People" will need no introduction to the pencil drawings of J. H. Dowd. John Drinkwater says of them: "They catch with unerring skill the grace of childhood in repose and movement, its lovely poignancy, its inimitable, yet unconscious, humour." So it is with the greatest of pleasure that we welcome the companion volume, "People of Importance," with its vivid portraits of children in all stages of development —as tiny babies, lusty toddlers, older brothers and sisters; children in all manner of surroundings—quiet hayfield and city street, at the circus, the beach, and the playground; children eating, sleeping, walking, playing. One section is devoted to "country faces" and there are some fine sketches of country scenes and animals.

Brenda E. Spender has supplied the text with sympathetic insight into the world of childhood. She writes, "The child has an imagination hardly limited even by the lack of knowledge or experience, for it is wonderful what original but satisfying use the smallest child, building an imaginary world, can make of facts and fancies which one would hardly have guessed had ever come within its ken. They can be great generals or queens—or milkmen —with all the proper accessories merely at a wish; they can own castles where no grown-up sees anything but a newspaper with holes in it hung up across a corner of the nursery, or drive flocks and herds before them on the strength of a couple of battered toy animals." The delicacy and charm with which she portrays the inner life and adventures of the very young remind one of Katherine Mansfield.

Life is full of toil and trouble,
Two things only stand like stone:
Kindness in another's trouble,
Courage in your own.

—Lindsay Gordon.

BEAUTY WHILE YOU WORK

Correct posture turns every daily task into a beauty exercise. To bend with a straight back, using the pelvic 'hinge' nature provided, is a fine way to slim the hips. Also it's less tiring. Curving the spine puts a strain on the back muscles and compresses the organs of chest and abdomen, and so hampers their functioning. In no time you're tired, your back aches. Think of the number of times a day you bend . . . the wrong way! You lift a bucket, make a bed, weed the garden. Why, most of the day you're bending! Think then, of the cumulative harm to health and beauty in doing it the wrong way every time.

All posture faults—poking heads, slumped shoulders, protruding waists—add fat and subtract energy. Correct posture is worth cultivating. Once it becomes a habit it's easy. And... what it does to improve the figure simply hasn't been told yet!

Berlei knows perhaps better than any what good posture means to your better poise, your better carriage, your better health, your better figure. The Berlei five fundamental figure types are based on the truth that only the right foundation can give you good posture. Ask particularly for your right type garment now supplies are short. It's worth some effort to get.

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TRUE-TO-TYPE FOUNDATIONS

HOBBIES FOR CHILDREN

THE children of this country are indeed fortunate in having parents who are alert to their mental needs as well as their physical welfare. The cultivation of hobbies which foster the development of natural talents and the ability to use leisure rightly is of incalculable benefit not only in childhood, but throughout the whole of life. I am pleased to find that mothers stress the importance of the choice of hobby being determined by each child's personal tastes and inclination.

"A.B.C.", Lowry Bay, and "Young Mother", Nelson, tied for first place, and the second prize was awarded to "Felicity," Manawatu.

First Prize (equal):

HAPPY the children whose parents realise the value of hobbies and foster a love for them by encouragement and provision of suitable materials. These children will always find something to think about and do in their spare time and will learn to be both skilled and useful. I consider, however, that the most important use of hobbies is as a source of character training. We should watch our children to see what things most interest them. If they have a constructive bent they will be delighted with a set of tools of their very own and get great pleasure from making various articles. These may at first be crude and clumsy, but the child has had the joy of creating something and in time it is really surprising what wonderful things he can make with a hammer, nails and a few pieces of wood. Meccano, too, is a never-ending source of amusement to some children, and what excellent training it gives in concentration, precision and initiative. Paste, paints and scissors have their appeal — even the tiny tots enjoy using them. The gay colours and pretty shapes and the arrangement of the pictures are of great use in artistic education. Children should be encouraged to make scrap-books for younger brothers or sisters or for the hospitals and they should also be taught to tidy up and put their materials away when they have finished.

For girls the care of their dolls is usually a favourite hobby. What pleasure they derive from making their clothes and washing and ironing them; in taking their dolls for outings and bathing them and putting them to bed —all helpful training for "little mothers." If stamps appeal to your children as they grow older it is wise to encourage such a hobby, as this helps them with their geography, interests them in other countries, and so broadens their outlook on life; while the sorting and arranging and exchanging of the stamps will keep them busy for hours.

Most boys and girls are keenly interested in Nature, especially when their attention is called to its wonders and beauties, and they love to collect such things as leaves and flowers, insects, shells, and different kinds of rocks and pebbles. Parents should help them to name and classify their specimens. Every child should have his own garden where he can watch the seeds grow and tend the plants. Through their close contact with Nature children's lives are enriched: wherever they go they will find something of interest; something which costs little or nothing and takes them out into the fresh air; something which counteracts the feverish rush and excitement of so much of our modern entertainment; and above all, something which increases their reverence for the Creator.— **"A.B.C.", Lowry Bay.**

Competitions.

June

I am looking forward to hearing about your activities from the entries for the winter competition "How I spend the winter evenings." Closing date, June 15.

July

Have you ever felt in an introspective mood and reflected upon various happenings in the course of your life? Often when we look back over a period of years we can see how some event—unsought and unwelcome at the time, perhaps—has altered the whole tenor of existence, widening our outlook and enriching us thereby. I am sure all of you have encountered some such experience, so how about recording it for the benefit of other "Good Neighbours"?

"A CHANGE WHICH MARKED A TURNING-POINT IN MY LIFE."

There are two prizes, 10/- for the first and 5/- for second. Replies must be in by July 15.

"MARY,"
C/o. "Journal of Agriculture,"
P.O. Box 3004, Wellington.

First Prize (equal):

EVERY child should be encouraged to have hobbies. The more varied they are the more worthwhile and interesting his own life will be. It is best to let the child choose for himself —he will know what interests him most, but every child should be taught to love and appreciate Nature. He should be given a garden plot of his own, for either vegetables or flowers. To watch the young seedlings unfold and grow into something beautiful (and perhaps edible) is a lesson in itself to a young child. The weeding and general upkeep of the plot will give him responsibility. Poultry keeping is very good for the older child, not only the tending but buying the feed and selling the eggs and learning the value of money thereby.

If a child shows musical talent, or even if he is merely musically inclined, it is beneficial to himself and the rest of the family to help along this gift by professional aid. Stamp and card collecting increase a child's general knowledge, and his choice of reading matter will undoubtedly reflect his character. Having penfriends is a grand hobby, specially if the friend is in another country. It will give the child an insight into the lives and customs of the people of that country and he might even learn the rudiments of another language.

Cooking and lighter household duties can be pleasing and instructive to a girl. She should be encouraged to do both plain sewing and embroidery. Fishing will have more appeal to boys and teaches them much concerning aquatic life, as well as the virtue of patience. For the older lad yachting and rowing are healthy and muscle-building. Carpentry and minor engineering should be taught to those interested—not only is it handy to be able to make various gadgets for relatives and friends, but it is an absorbing hobby in itself and may prove to be the beginning of a career in later life.

Finally, the children's pages in newspapers and magazines are a wonderful

PEACE TALK

Through the chaos of war shines a hopeful future . . . a future of new promise and opportunity for young lives of to-morrow. And in the midst of war it is sometimes good to let our minds dwell on thoughts of peace . . . of the good things in life we are fighting for.

To-day, Onehunga products are out there fighting, too. They're doing their bit "over there," so please don't become impatient if you find that your retailer can't supply all the Onehunga goods you want. The Onehunga Mills are occasionally able to release limited quantities of their famous products for civilian use, so just keep on trying, and when you can buy Onehunga quality you'll realise it has been worth waiting for.

ONEHUNGA

ONEHUNGA BLANKETS —— AIR-CELL BLANKETS —— ONEHUNGA WOOLLENS & TRAVEL RUGS. Distributors: SARGOOD, SON & EWEN LTD.

outlet for young imaginations. Writing for these pages teaches them the art of self-expression and doubtless will improve spelling and grammar, too!—**"Young Mother", Nelson.**

Second Prize:

CHILDREN have a vast amount of energy and if they find themselves with time on their hands and nothing to do, they may, lacking guidance, often find the wrong way of using up this energy. All children should be encouraged, therefore, to take up some hobby. An attempt should be made first to discover the child's natural "bent" or inclination and the parent or teacher can do a great deal to influence the choice and direct it in the right channels.

All forms of self-expression are good hobbies. Weaving, painting and modelling help to develop the mind and are a wonderful medium of expression for the inarticulate child. As well as the higher forms of art, cooking, gardening, dressmaking and carpentry are interests which are well worth cultivating, and will be profitable to the child in after life.

Circumstances and environment often play a part in the selection of a hobby. Letters from a relative in a foreign land may lead to stamp collecting which, in turn, stimulates interest in geography. Similarly, collecting in a scrap-book photos of royalties and celebrities and items of interest adds to a child's general knowledge. If a child lives near the bush, learning to recognise native trees, and with a lathe, turning native wood into bowls, paper knives, etc., is very profitable. Bee-keeping, with a little assistance, is not beyond the older child and presents an endless field of interest.

All children should be encouraged to read, not to the exclusion of other hobbies, but rather in correlation with them. Reading can have a great influence for good or ill; thus parents would be wise to supervise their children's choice of books. Music may be a hobby for some children, but often it is just another lesson to be learnt. On the other hand elocution is a simpler mode of expression and for the "tom-boy" I think nothing is better than dancing.

One of the chief aims of our modern education is to teach a proper use of leisure. A good hobby does more than keep a child out of mischief; it achieves this educational purpose and in so doing develops his talents and character.—**"Felicity", Manawatu.**

Highly Commended:

THE choice of a hobby lies with the child—it can't be imposed by the parents. It would be useless and harmful to insist that a child take a practical interest in music when his whole bent is towards mechanics, or to urge that aeroplanes and electricity be the most important interest when his greatest joy is to express himself with paint or pencil. I do not think it matters what he chooses for a hobby as long as it is something through which he can progress and widen his horizons. The parents' part is to encourage and admire, to provide books, instruments or material for construction, according to the nature of the hobby. It is also good for the child to give him extra work to do about the home and pay him for it, so that he may himself earn the money to pay for his hobby. This helps to accustom him to the conditions he will meet when he goes into the world and has to "pay his own way." If he takes over the care of the fowls or the vegetable garden, this is an opportunity for training in practical living. He should be taught to keep account of his costs and mother could pay for the eggs and produce he provides for the household.

Looking after animals is very good discipline, also. To have some helpless creature dependent on him for care gives him a sense of responsibility and an outlet for his emotions of tenderness and love which he, in his turn, receives from the adults around him.—**"Late-comer", Feilding.**

Childhood

Childhood is only the moment when the bird flying into the lighted hall has still some dew of the night from which he came upon his feathers.

From "People of Importance."

This new free booklet from

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helps you solve many wartime food problems

36 pages of simple, practical suggestions — specially prepared to give wartime help to those who bought more than seven million Frigidaires—now offered to every refrigerator user! Call or send for your free copy of WARTIME SUGGESTIONS today.

Today it's specially important to take good care of your Frigidaire Refrigerator and thus enjoy fully the protection and economy it was built to provide.

YOU FACE NEW PROBLEMS

The war has played havoc with meal-planning. Almost daily you are confronted with new food-buying and food-keeping problems.

Our major responsibility is to turn out weapons and war materials for our armed forces. Yet knowing how important refrigeration is, we are anxious to help solve some of your wartime refrigeration problems.

Necessary wartime measures may have changed your pattern of living, particularly your shopping and eating habits. For some foods are rationed. Others not always easy to get. Besides, store deliveries have been curtailed. Shopping trips are fewer.

Even so, your refrigerator can help make meal-planning easier — if it is used properly.

DO YOU KNOW THESE THINGS?

Do you know how to defrost and completely clean your refrigerator in just fifteen minutes? WARTIME SUGGESTIONS tells you.

Do you know all the facts about keeping fresh meat safely? Which meats should be frozen, if kept more than twenty-four hours? WARTIME SUGGESTIONS tells you.

Do you know what can safely be kept outside of your refrigerator; what must go in? WARTIME SUGGESTIONS tells you.

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Frigidaire's new, timely booklet, WARTIME SUGGESTIONS, is filled with useful, helpful ideas. It tells you how to make your refrigerator seem larger, how to keep ready-cooked foods on hand, now that canned foods are rationed. Gives meat-keeping facts you need today. Tells how to use left-overs. Lists easy way to give your refrigerator the best of care. Answers dozens of questions every housewife is asking.

We want you to have a copy. It represents the combined thinking of Frigidaire home economists, engineers, and service experts.

Look for the Frigidaire sign on your dealer's store, or find name and address in the classified pages of your telephone directory.

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Parties for Children

So you are giving a children's party? Well, whether this is your initial effort in this direction or whether you are an old hand at running such festivities, you may be glad of a few ideas to make your particular celebration a distinctive one. Are they all small folk you intend asking? Hardly worth while bothering to send out invitations when the telephone is so handy, yet for the sake of a stamp and a little trouble what a pity to deny a youngster the pleasure of receiving a letter of his very own through the post, specially if it reveals a pretty picture pasted at the top of the page when opened.

If the weather is unsuitable for playing outdoors you will be wise to clear a room for this purpose—worrying about the safety of precious ornaments or scratches on polished furniture is no way to foster the party spirit. The old games like Poor Sally is a-weeping, Mulberry Bush, and Hunt the Thimble are still prime favourites, and if you can have someone at the piano it adds greatly to the verve of the occasion. Follow an energetic game such as Musical Bumps with a quiet one that does not call for much exertion. Do you know the old folk song "When I was a Lady"? This makes a splendid action game.

"When I was a lady, a lady, a lady,
When I was a lady, a lady was I.
And this way, and that way, and this way, and that way,
And when I was a lady, a lady was I."

On singing the words "this way" and "that way" everyone curtsies to the left and then to the right, with an extra deep curtsey for the last line, "a lady was I." One can continue the verses with an endless repertoire of characterisations, all accompanied by appropriate gestures, of course—a gentleman bows, a dancer pirouettes, a soldier marches and salutes, an engine chuff-chuffs and whistles, a goldfish makes swimming movements, and so on.

When it is getting near teatime a quieter mood can be induced by seating the children in a circle on the floor and telling them a story or else arranging for a grown-up with clever fingers to model tiny figures out of plasticine—perhaps there could be one for each child to keep. Tea is always the high light of a party and it is well worth the extra effort to have the "sit-up-at-the-table" kind, for few small children are adept at managing a plate on their knees. Paper caps at each place make a gay note and if you are having raspberry drinks and fruit moulds choose scarlet streamers to match or if your decorations run to orange and lemon tones, then let the jellies and sweets and cordials be in the same colourings. Sandwich fillings should be suitable for young digestions; cakes of the sponge variety are best and biscuits of a basic wholesomeness such as wheatmeal, oatina, oatmeal and the like. Wonders can be achieved with the aid of different icings and the addition of chopped nuts, cherries, raisins, coconut and jubes. Jellies, both the fruit kind and those with a milk foundation, are a delight to the eye and conform to the diet rules which every sensible mother observes with her family.

Instead of the usual birthday cake have you ever made a batch of small cakes in patty pans instead? Iced in pink and each one bearing a candle of a different hue, they look most effective and they have the advantage of being easily wrapped if the little guests prefer to take them home instead of eating them straight away. And talking of home-going, what child does not like to have some tiny souvenir of his outing to carry away with him? In pre-war days when there was a plenitude of toys and balloons this was an easy matter. Nowadays it takes more thought and effort to produce a gift. Toffee apples are always welcomed by the small folk or you may prefer to offer them home-made fudge in pretty wallpaper baskets or wrapped in cellophane twisted in the form of bon-bons.

If you are entertaining older children, have you considered holding a fancy dress party—not the usual kind where mothers spend hours of sewing and contriving beforehand and everybody comes in costume, but one where the dressing-up takes place after arrival? Collect all the old clothes and "props" you can find (enlist the aid of the other mothers—they will be certain to enjoy the fun of contributing) and arrange them in a suitable place and leave your guests to rummage for themselves. Be sure to have two or three mirrors handy! You may like to give a prize for the best results. It is rather fun to don some kind of disguise yourself before getting ready to preside over the refreshments. A novel form of placecard is to fashion each person's initial from pastry or a plain biscuit mixture — this can be frosted or decorated in whatever manner you desire. Cut the sandwiches into heart and leaf shapes with fancy cutters and don't forget to include some savouries among all the sweet things.

Should the masculine sex predominate why not have a Wild West party? Scrim or sacking can be used for pants, with fringed seams, realistic guns and holsters can be carved from odd pieces of wood and with a dark handkerchief tied scarfwise and a wide-brimmed hat, hey presto! your youngster is transformed into a cowboy. Let the whole posse whoop and climb and run and generally work off energy outside. Cater for their lusty young appetites with a ranch meal of bean and bacon stew or sausages and potatoes roasted in their jackets, finishing off with fruit and generous slices of chocolate cake and piping-hot milk drinks. And if you can get hold of a little musical talent in the form of a mouth-organ or a guitar and conclude with a sing-song round a real campfire it will add an excellent touch of realism to the proceedings. You will find it a grand way of entertaining the lads!

A Child's Thoughts

Who can tell a child's long thoughts
As he dreams among the cool,
Green shadows sunlight weaves about
The trees beside a bushland pool?
Does his fancy, shining-winged,
Hover and take flight at will
Like the dragon-flies that dart
Above the wat'r? How gently still
The air, until the drowsy throb
Of bees stirs echoes heard before—
Is his a vision of dim seas
Beating on some dream-like shore?
Perhaps the rata's scent recalls
Wind-breath of more exotic flow'rs.
Who knows what strange, unwearied thoughts
A child will ponder through the hours?

—Enid B. V. Saunders.

Clothesline

The wind to-day is having fun;
For out there hanging in the sun
Are little shirts for it to shake,
And small girls' bright and frilly clothes,
And rainbow-coloured socks in rows,
And well-patched khaki shorts, and fake
Grown-up long pants for a five-year-old.
The wind is gay, the wind is bold:
It spanks the important pants, it billows
The dresses out to ruffled pillows,
It throws the worn shirts over its shoulder,
And blows up the socks with a puff of sky;
And I wonder if it wishes, as I,
That the ones they belong to would never grow older!

—Frances Frost.

Once upon a time

There was a lady who was baking a very special sponge for a very important supper. Well, this lady had just mixed in the Baking Powder when she heard a crash and then silence, and then a terrific caterwauling, and she said "My goodness," and rushed into the front room. Well, when little Lennie had been comforted and she had

fixed things up, which took about half an hour — you know how time flies— back she came to finish the mixing of this sponge we are talking

about, and she popped it in the oven and timed it to the tick, and when she opened the oven door

the sponge was as flat as a pancake. And do you know why? Because pre-war Baking Powder started working as soon as it was mixed, and sometimes worked itself out before it got in the oven, which caused many failures one way and another.

To-day that's all changed. Phosphate Baking Powder does its work in the oven . . nowhere else. Today, if you've mixed in the Baking Powder and the 'phone rings or baby cries, or anything else calls you away, there's no harm done. Even if you're away for an hour or more, simply stir mixture *gently* before putting into oven.

Also, Phosphate Baking Powder is superior to pre-war Baking Powder for aeration, texture, taste and keeping quality.

BAKING POWDERS MADE FROM FOOD PHOSPHATE

mean Better Baking Powder - Better Cooking
plus Better Health

The Pure Food Phosphate now used by all reputable Baking Powder Manufacturers is a product of Albright & Wilson, and is distributed in N.Z. by Imperial Chemical Industries (N.Z.) Ltd., 16 The Terrace, Wellington.

Mary's Mixing Bowl

Party Fare

THE great thing about catering for children is to have a few suitable recipes that you can count on and plenty of ingenuity. A judicious use of colour and a flair for arranging things in a decorative manner enable one to serve wholesome food attractively and work wonders with finnicky appetites. In these days of rationing and restrictions party-giving is a real test of your skill, yet with careful planning it is still possible to celebrate family birthdays appropriately.

If you have already stretched your butter ration in the manner suggested below, but find it insufficient, why not go in for sponges which do not require butter, and vary the mixture with such flavourings as coffee, cocoa, ginger, etc.? Try spreading scones and gems with jam instead of buttering them. If eggs are in short supply, then make plain rolled-out biscuits without any, and cut them into fancy shapes and ice them. Grated chocolate makes a delicious topping for a cake frosting and if you cut jubes slantwise in thin slices to reveal the full richness of their colouring, you can fashion the loveliest flower patterns with them.

Here are two good substitutes to take the place of that time-honoured, but alas! practically unobtainable item of party fare—fruit salad:—

FRUIT DELIGHT.

2 dessertspoons gelatine, 2 tablespoons lemon juice, 2 egg whites, 2 cups fruit pulp, 1 cup fruit juice.

Fresh fruit stewed and sweetened or bottled fruit may be used. Reserve 1 cup of the syrup and pass the rest of the fruit through a sieve to form a smooth puree. Dissolve the gelatine in ½ a cup of hot water, stir in the fruit juice and the lemon juice (the latter can be omitted if desired), then blend in the fruit puree. Leave to thicken slightly and then add the egg whites beaten stiffly (add a pinch of salt before commencing beating). Put in a cool place to set.

CHOCOLATE JELLY.

2 tablespoons cocoa, 8 tablespoons sugar, vanilla essence, 8 tablespoons water, 1 quart milk, 2 tablespoons gelatine.

Mix together the cocoa, sugar and water and cook for three minutes. Bring the milk to boiling point and add to the cocoa mixture, lastly adding the gelatine which has been dissolved in hot water. Pour into a mould and leave to set.

If you are one of those fortunates who possess a refrigerator, you will be glad of this recipe for making ice cream without using real cream:—

ICE CREAM.

1½ pints milk, 3 eggs, 1 teaspoon salt, 1 cup sugar, 1 dessertspoon grated lemon rind, 2 dessertspoons lemon juice.

Chill the milk thoroughly, then, gradually adding the sugar, beat till light and fluffy. Beat the eggs, mix in the salt and grated lemon rind and juice, and add to the milk. Pour into freezing tray and set the control at the point advised for ice-cream freezing and leave to set. When the mixture becomes firm alter the control to normal.

Now for some baking:—

SPONGE.

2 eggs, ½ cup sugar, ¾ cup flour, 1 teaspoon baking powder, 1 tablespoon boiling water.

Beat the eggs and sugar till they are thick and creamy, then stir in the sifted flour and baking powder, and when this is well mixed in add 1 tablespoon of boiling water. Pour into a greased tin as quickly as possible and bake in a moderate oven 15-20 minutes.

CHOCOLATE CAKE.

1 tablespoon golden syrup, ¼ lb. butter, ½ lb. sugar, 1 cup milk, 10 ozs. flour, 1 dessertspoon cocoa, ¾ teaspoon baking soda, ¾ teaspoon baking powder.

Warm the butter, sugar and syrup in half the milk, and sift in the flour, baking powder, and cocoa. Lastly add the baking soda dissolved in the remaining ½ cup of milk—this results in a very wet mixture. Bake half an hour in a moderate oven. When cool ice with chocolate icing and dot with raisins and walnuts.

MAKING BUTTER RATION GO FURTHER.

Stir 1 teaspoon gelatine into 2 tablespoons milk, holding it over boiling water until the gelatine is dissolved, then add a cup of top milk and beat it gradually into ½ lb. butter which has been softened to room temperature. Use a rotary beater for this. Add 1 teaspoon of salt to the butter mixture just before you finish beating.

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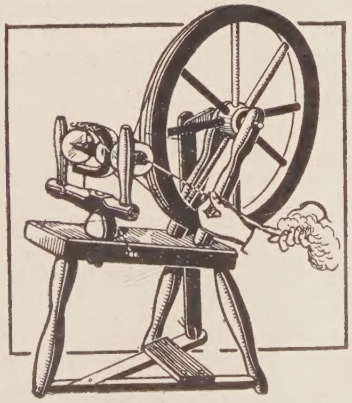

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Pack the butter into a dish and chill. It is a good idea to set the dish inside a container of cold water.

WHOLEMEAL BISCUITS.

4 ozs. flour, 4 ozs. wholemeal, 4 ozs. brown sugar, 3 ozs. butter, ½ teaspoon baking soda, ½ teaspoon salt, milk to mix.

Cream the butter and sugar, add the sifted flour and other dry ingredients. Dissolve the baking soda in a little milk and add, using sufficient milk to mix to a firm dough. Roll out on a floured board and cut into shapes. Bake 15 minutes at biscuit heat. Ice and decorate as desired.

CHOCOLATE OATINA WAFERS.

1 cup flour, 1 cup oatina, ½ teaspoon salt, 3 ozs. butter, ½ teaspoon baking powder, 2 dessertspoons cocoa.

Cream the butter and sugar together and add the dry ingredients. Mix with milk to a firm dough and roll out and cut into oblongs. Cook 15 minutes in a moderate oven. Chopped nuts and cherries with chocolate icing make a nice finish.

MERRY-GO-ROUNDS.

8 ozs. flour, ½ teaspoon salt, 2 ozs butter, sugar and cinnamon, milk, 1 teaspoon baking powder.

Rub the butter into the sifted flour and add the salt and baking powder. Mix to a firm dough with milk, then knead lightly on to a floured board and roll out to about ½ inch in thickness. Sprinkle well with cinnamon and sugar (allow 1 teaspoon of cinnamon to 5 teaspoons of sugar). Roll up into the shape of a sponge roll and cut in slices. Bake in a hot oven 18-20 minutes.

DATE SQUARES.

¼ lb. sugar, ¼ lb. brown sugar, 1 cup flour, ½ cup water, 1 cup rolled oats, 1 teaspoon baking soda.

Filling: ½ lb. dates, 2 ozs. brown sugar, 3 tablespoons water.

Cream the butter and sugar, add the dry ingredients and lastly the soda dissolved in a small quantity of hot water. Use more water for mixing if necessary. Roll out half the mixture and spread with a filling made of dates and sugar cooked with a little water for a few minutes to soften them into a paste suitable for spreading. Cover with the remainder of the oatina pastry, cut into squares and bake in a moderate oven 15 minutes.

BIRTHDAY BUNS.

¼ lb. butter, ¼ lb. sugar, 1 cup flour, 1 teaspoon baking powder, 1 egg, ½ cup sultanas and walnuts.

Cream the butter and sugar, add the beaten egg, and then the rest of the ingredients. Bake in patty pans for about 20 minutes in a hot oven. These make ideal "individual" birthday cakes for children and can be decorated with frosting and tiny coloured birthday candles.

BRAN MUFFINS.

2 cups bran, pinch salt, 1 cup flour, 2 ozs. butter, 1 teaspoon baking soda, ½ teaspoon baking powder, 1 small cup golden syrup, 1 cup milk.

Warm the syrup, butter and milk together and add to the other ingredients, dissolving the baking soda in a little of the milk before mixing. (The resulting mixture will be very moist). Bake in patty pans or gem irons for 15-20 minutes in a moderate oven.

FUDGE.

2 cups sugar ½ cup milk, 1 oz. butter, 2 tablespoons coffee essence, vanilla.

Place all together in a pan and bring to the boil, then boil exactly 10 minutes (without stirring), only shaking it now and then. Remove from the heat, add vanilla essence to taste, and beat to a stiff paste. Then leave it in a buttered tin to set. Mark into squares and cut before it is cold.

DATE FONDANTS.

Dates, 1 cup icing sugar, milk, rose or raspberry flavouring, cochineal, small lump of butter.

Mix the icing sugar, butter, flavouring and milk together to form a stiff cream and add a few drops of cochineal for colouring. Stone the dates and fill with the fondant, dipping the dates afterwards in coconut.

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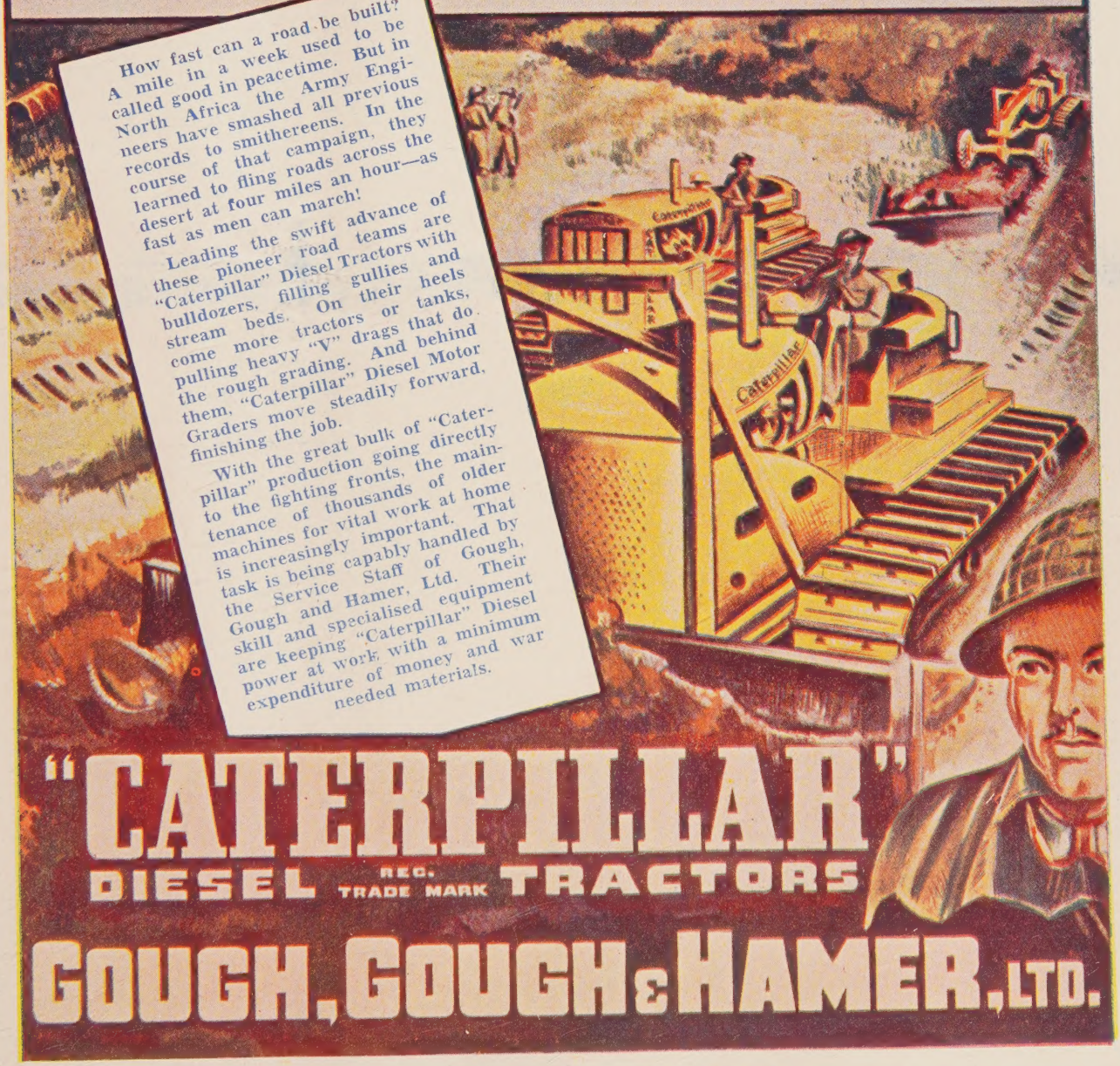

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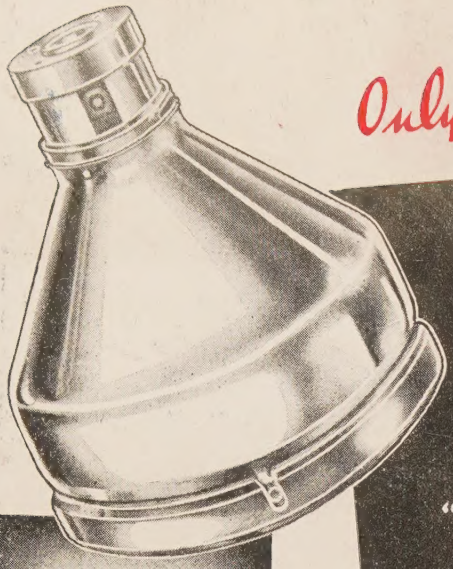

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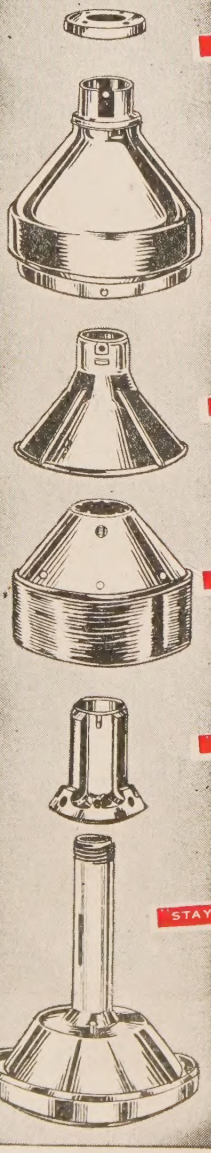

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